

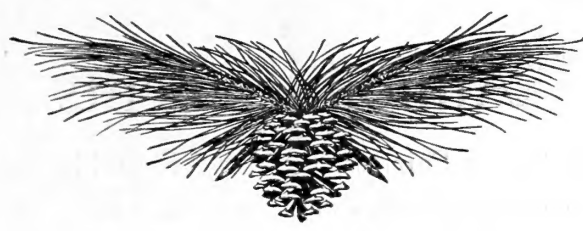
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FOREST WORKER



September, 1929

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Second Georgia Forest Fair

The second annual State forest fair of Georgia will be held November 21-23 at Valdosta, Ga., under the general direction of the Georgia Forest Service with the Valdosta Chamber of Commerce assisting. Exhibitors will include Federal and State forestry organizations, forestry and lumber associations, and manufacturers of lumbering, fire fighting, and fire-break construction implements and machines. An educational program of moving pictures, lantern slides, and lectures will be carried out in the exhibit building, and it is planned to conduct demonstrations at near-by forests on methods of growing seedlings, planting, turpentine, thinning, constructing firebreaks, fighting forest fires, and burning railroad rights of way.

Pan American Agricultural Conference

The Pan American Union has announced that an inter-American conference on agriculture, forestry, and animal industry will be held in Washington, D. C., in 1930, opening on May 12.

First Florida Forestry Fair

The first Florida forestry fair will be held in Lake City, Fla., November 13-15, under the direction of the Florida Forestry Department. Its purpose will be to stimulate interest in forestry and demonstrate the possibility of increasing forest production through protection. Exhibits will be shown by forestry and lumber organizations, and forestry tools and equipment will be displayed by manufacturers. Methods of fire-line construction will be demonstrated. A trip to various turpentine plants will be directed by Lenthall Wyman, associate silviculturist of the Southern Forest Experiment Station.

Second Pan Pacific Food Conservation Conference

The Pan Pacific Union has issued tentative agenda for the Second Pan Pacific Food Conservation Conference, to be held in Honolulu, August, 1931. One of the subjects for discussion in the reclamation section is forests as related to streamflow.

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State Forestry

Forest Fires in 1928

Forest fires occurring in the calendar year 1928 covered 43,931,310 acres of land in the United States,¹ according to a summary of reports of State forestry officials and of national forest officers. Reports of fires on the 178,855,050 acres of land needing fire protection for which such protection has not yet been provided show that 39,502,810 acres of this land were burned over during the year, with damage estimated at \$74,350,600. Of the 389,498,960 acres of protected land 4,428,500 acres were swept by fire, with damage estimated at \$8,583,620. Thus the year's fires covered about 1 acre in 5 of the land that was without protection, and about 1 acre in 100 of the protected land.

Reports of State officials and of national forest officers for 1928 list a total of 177,362 forest fires. Of the fires reported 40,579 occurred on protected lands and 136,783 on areas without protection.

In 1928, organized fire protection maintained independently or cooperatively by the Federal Government, State governments, and private landowners was extended over nearly 20,000,000 acres of land that had not been protected in 1927. This made the total protected acreage 389,498,960, or 68.5 per cent of the total in need of protection.

Smokers were responsible for the largest number of fires on protected lands, causing 8,346 fires, or 20.6 per cent of the total. Incendiarism ranked next among the causes to which fires were traced, being found responsible for 7,276, or 17.9 per cent, of the year's fires. Brush burning was reported to have caused 13.2 per cent of the fires, lightning 9.3 per cent, camp fires 9.1 per cent, railroads 8.9 per cent, lumbering 3.9 per cent. For 7.9 per cent the causes were unknown. Reports as to causes of fires on unprotected areas were not sufficiently complete or reliable to warrant tabulation.

¹ Figures given in this article are for private and State-owned forest land and national forests in continental United States exclusive of Alaska. Those for unprotected areas are necessarily rough approximations.

In 1928 as in 1927, more forest fires were reported in the Gulf States than in any other group. A total of 99,120 fires on unprotected land and 12,987 on protected land were reported in this group of States, which includes Alabama, Mississippi, Louisiana, Texas, Arkansas, and Oklahoma. As against 1.14 per cent for the United States, for this group of States the proportion of the protected forest area burned over during the year was 5.60 per cent. For the other groups of States the proportion of protected area burned over was as follows: Central States (Ohio, Indiana, Illinois, Kentucky, Tennessee, Missouri), 1.68 per cent; Pacific Coast States (Washington, Oregon, California), 1.64 per cent; Middle Atlantic States (New Jersey, Pennsylvania, Delaware, Maryland), 0.99 per cent; Southeastern States (Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida), 0.98 per cent; Lake States (Michigan, Wisconsin, Minnesota), 0.43 per cent; Northeastern States (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York), 0.21 per cent; and Rocky Mountain States (Montana, Idaho, Wyoming, South Dakota, Colorado, Arizona, New Mexico, Nevada, Utah), 0.12 per cent.

California Maintenance Crews Subject to Service on the Fire Line

A new agreement between California's departments of public works and natural resources gives 1,700 highway maintenance men the status of emergency forest fire fighters. Maintenance crews will at all times be subject to call by State rangers for combating fires on and adjacent to highway rights of way and when called to a fire will work under the command of the forest ranger or inspector in charge until relieved. When maintenance men discover fire near their work they will independently take charge of its suppression until members of the State fire patrol reach the scene. Salaries of maintenance men for time spent in fighting fire will be paid by the State forest service unless the fire has been caused by highway maintenance operations.

Clarke-McNary Tree Distribution in 1928

In the calendar year 1928, 28,757,448 forest trees were distributed to farmers by 34 States, Hawaii, and Porto Rico in cooperation with the Federal Government under provisions of the Clarke-McNary law. Timber production was the principal or sole purpose of most of the farm plantings thus provided for; the development of shelter belts and windbreaks was a minor purpose in 15 States and Porto Rico, the major purpose in Washington, Oregon, Nebraska, Colorado, and Oklahoma, and the sole purpose in Hawaii, California, Montana, Wyoming, North Dakota, and Kansas. The total number of trees distributed by the cooperating agencies, the species and ages predominating among the stock so distributed, and the approximate range of prices to the farmer per 1,000 trees, have been summarized from the agencies' reports as follows:

Maine: 123,470; northern white pine, white spruce, and Norway pine; 3-year transplants; \$8.

New Hampshire: 536,794; northern white pine, Norway pine, and white spruce; 3-year and 4-year transplants; \$5.95 to \$7.50.

Vermont: 862,500; Norway pine, northern white pine, Norway spruce, and Scotch pine; 2-1 year transplants; \$6.

Massachusetts: 1,139,700; northern white pine, Norway pine, Norway spruce, and white spruce; 3-year, 4-year, and 5-year transplants; \$7.50 to \$14.

Connecticut: 340,600; Norway pine, northern white pine, white spruce, and Norway spruce; 2-year and 3-year seedlings, 3-year and 4-year transplants; \$4 to \$10.

New York: 9,840,000; northern white pine, Norway pine, Norway spruce, Scotch pine, white spruce, European larch, black locust, balsam fir, northern white cedar, Carolina poplar; cuttings, 2-year seedlings, 3-year transplants; \$1 to \$5.

Pennsylvania: 9,062,396; northern white pine, Norway pine, Scotch pine, Norway spruce, Japanese larch, white ash, pitch pine, black walnut, white spruce, black locust, red oak; 1-year to 4-year seedlings, 2-2 year, 3-1 year, and 2-1-1 year transplants; \$2 to \$5.

New Jersey: 783,000; Norway pine, Norway spruce, Scotch pine; 2-year seedlings; \$4 and \$6.

Maryland: 144,500; Norway pine, loblolly pine, Norway spruce, Scotch pine; 1-year and 2-year seedlings, 2-3 year to 3-5 year transplants; \$2.50 to \$30.

Delaware: 66,600; loblolly pine, Norway spruce, Scotch pine; 2-year seedlings; free¹ to \$2.50.

Virginia: 31,007; loblolly pine, black locust; 1-year and 2-year seedlings; \$4 to \$7.50.

North Carolina: 175,947; loblolly pine, longleaf pine; 1-year and 2-year seedlings, \$3.

Georgia: 24,000; slash pine, loblolly pine; 1-year seedlings; \$2.50 and \$3.

Alabama: 48,600; longleaf pine, black walnut, catalpa; 7-month and 8-month seedlings, free¹ to \$2.50.

Louisiana: 250,800; longleaf pine, black locust, slash pine, loblolly pine; 1-year seedlings; \$1.50 (for all).

Oklahoma: 18,800; Chinese elm, black walnut; 1-year and 2-year seedlings; free¹ (for experimental planting) to \$10.

Ohio: 1,528,200; Norway pine, Scotch pine, Corsican pine, black locust, Austrian pine, black walnut, white ash, Norway spruce, red oak, northern white pine, western yellow pine, yellow poplar; 1-year, 2-year, and 3-year seedlings, 1-1 year, 2-1 year, and 2-2 year transplants; \$1.50 to \$5.

Indiana: 361,900; Norway spruce, black locust, Norway pine, northern white pine, black walnut, yellow poplar, Scotch pine, white oak; 1-year and 3-year seedlings; \$2.50 to \$10.

Kentucky: 42,400; black locust, black walnut; 6-month and 1-year seedlings; \$5 and \$10.

Tennessee: 91,800; black locust; 1-year seedlings; \$1.50.

Missouri: 2,200; osage-orange, northern white pine; 1-year and 2-year seedlings; free¹ and \$6.

Iowa: 52,800; black walnut, cottonwood, northern white pine, black locust, ash; 1-year and 2-year seedlings, 2-4 year and 4-6 year transplants; cost of packing, shipping, and transportation.

Montana: 43,500; caragana, green ash, boxelder, western yellow pine; 1-year seedlings, 3-year transplants; \$5 and \$6.

Idaho: 183,300; black locust, boxelder, western yellow pine; 1-year seedlings, 1-1 year transplants; \$2.50 to \$8.

North Dakota: 47,000; boxelder, caragana, green ash, Chinese elm; 1-year and 2-year seedlings; free¹ (all).

Nebraska: 682,000; Scotch pine, Austrian pine, American elm, caragana, honeylocust, mulberry, green ash, catalpa; 1-year seedlings, 1-1 year and 2-1 year transplants; \$10 (all).

Kansas: 17,750; osage-orange, tamarix (and 14 other species); cuttings, 1-year and 2-year seedlings, 2-year and 3-year transplants; \$16 to \$40.

Wyoming: 47,685; western yellow pine, cottonwood, "diamond willow"; 2-year seedlings, 2-1 year transplants; \$12 to \$50.

Colorado: 154,300; western yellow pine, honeylocust, American elm, Russian olive, blue spruce; 1-year and 2-year seedlings, 2-1 year and 3-1 year transplants; \$10 to \$40.

California: 28,250; shortleaf pine, redwood; 1-year and 2-year seedlings; \$5.

Hawaii: 197,600; cypress, Eucalyptus, melaleuca spp. (and 40 other species); ½-1 year transplants; \$6.60 to \$25.

Washington: 9,500; black locust (and 18 other species); 1-year and 2-year seedlings, 2-year to 8-year transplants; \$2.50 upward.

Oregon: 88,700; black locust, western yellow pine, green ash, Port Orford cedar; 1-year seedlings, 1-1 year transplants; \$2.50 (all).

Michigan: 660,649; Norway spruce, white spruce, jack pine, Norway pine, European larch, Japanese larch, northern white pine; 2-year to 7-year seedlings, 4-year transplants; free to \$10.

¹ Free distribution usually implies payment by the recipient of cost of packing, shipping, and transportation.

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Wisconsin: 627,700; Norway pine, northern white pine, Norway spruce, Scotch pine; 2-year and 3-year seedlings, 2-2 year transplants; \$2.50 to \$5.

Porto Rico: 441,500; Spanish cedar, saman, casuarina, capa prieta, capa blanca (and more than 25 other species); 3-month to 12-month seedlings; Two other States—West Virginia and Florida—free¹ (all).

were operating forest nurseries under agreements with the Federal Government in 1928, but their nurseries had not been in operation long enough to produce planting stock for distribution to farmers in that year.

In addition to their distribution of trees to farmers, in the calendar year 1928 the cooperating agencies distributed 18,330,141 trees for planting on private lands other than farms and provided 21,477,702 trees for planting on State lands. Thus the cooperators distributed in all 68,565,291 trees. This figure does not cover all planting stock distributed in that year from State forest nurseries; in a few cases forest planting stock was produced by State agencies not having cooperative agreements with the Federal Government.

Millions of State-Raised Trees Go Into Thousands of New York Plantations

Forest planting projects were begun or continued by 111 New York municipalities this spring, Conservation Commissioner Macdonald reports. Otsego, Erie, and Essex Counties planted 435,000, 400,000, and 314,500 trees, respectively. Sixteen railroads and other industrial concerns shared in the distribution of State-raised planting stock, the Northern New York Utilities (Inc.) alone calling for 1,250,000 trees to add to the large number produced in its own nurseries. Plantings of from 1,000 to 152,000 trees were made by 31 fish and game clubs; the latter number is reported for the Broome County Sportsmen's Association, which has been cooperating with schools throughout Broome County and starting demonstration forests on land belonging to the schools. Other organizations that joined in the season's planting of State-raised stock included 8 chapters of the Izaak Walton League, 16 golf and country clubs, and 6 Rotary, Kiwanis, and Lions clubs. Further growth of interest in school forest planting was shown, the State nurseries receiving orders from 40 schools, high schools, and colleges and from 14 school districts.

The season's distribution of State-raised planting stock, which contributed to 3,231 separate reforestation projects, is classified by the commissioner as follows:

	Number of trees
State land	4, 990, 550
Municipalities	3, 245, 950
Industrial concerns	2, 009, 450
Schools and colleges	290, 820
Boy Scouts	80, 250
Miscellaneous organizations	1, 246, 460
Individual landowners	8, 617, 800

Hawaii Plants More Trees and Reserves More Land for Forestry

Planting operations on the Hawaiian forest reserves in the past two calendar years required 418,531 trees, or twice the number planted in the preceding biennium. In all cases "ball planting," as opposed to bare-root planting, was practiced. Plantings by this method are practically 100 per cent successful, Superintendent of Forestry Charles S. Judd reports.

Recent increases in Hawaiian forest reserve areas have brought the total to 980,682 acres.

Pennsylvania Department of Welfare Operates Tree Nursery

Since 1924 the prison labor division of the Pennsylvania Department of Welfare has operated a forest nursery in Centre County, midway between Bellefonte and State College. This nursery, known as the Rockview Forest Tree Nursery, now covers 18 acres and contains more than 12,000,000 trees. All the labor, from the sowing of the seed to the lifting and packing of trees for shipment, is performed by inmates of the new Western Penitentiary. Men are assigned to the nursery regularly and are thus given the opportunity to gain a thorough knowledge of nursery work. Wages are paid to them according to their proficiency. All phases of nursery practice are taught, including seed collection, pruning, and grafting.

From 500,000 to 1,000,000 seedlings are transplanted annually. During the past spring 3.6 miles of nursery beds were prepared and seeded, and 970,000 seedlings and transplants were supplied to the forestry organizations of seven States and the United States Forest Service. Twenty-five species of forest trees are carried in stock. Twelve varieties of pines are available for the coming planting season.

Further information about this nursery can be obtained from the prison labor division, Pennsylvania Department of Welfare, Harrisburg, Pa.



Pennsylvania's auxiliary forest reserves total more than 41,125 acres, since the Clearfield Bituminous Coal Corporation recently added to its auxiliary forest reserve holdings 3,535 acres of land in Indiana and Cambria Counties.



Vermont can now boast 40 municipal forests. Grafton and Bennington began reforestation projects this year. Plantings made this spring on 11 of the forests totaled 168,550 trees.

California Forestry Division Uses Fire Trucks of Special Design

Four specially designed fire trucks constructed in the shops of the State division of highways were placed in service this year by the California Division of Forestry. The apparatus is built on a 2-ton truck chassis with compound transmission governed at a speed of 40 miles an hour. Each truck has a water tank holding 225 gallons and ten 5-gallon pumps of knapsack type. Each is equipped with a high-pressure fire pump driven by direct connection to the engine crankshaft through a clutch at the front end. The tank can be filled from a well or stream either by an intake suction pump or by gravity, or from a city fire hydrant. Each truck carries 2,200 feet of hose of different sizes, a searchlight, a heavy cross-cut saw, a sledge, falling wedges, crowbars, other hand tools, and mess equipment for 50 men. Each carries seven men conveniently, and can carry more.

The four trucks were stationed at Riverside, Ukiah, Auburn, and Bakersfield.

The North Carolina Department of the American Legion, in a resolution adopted at its annual convention at Raleigh, August 27, "indorses and recommends a program of reforestation, conservation, and restoration of wild life in North Carolina and commends to each individual post in this department that its members interest themselves in some phase of this work for the benefit of their own community and the State at large, sponsoring post activities in conservation and restoration and cooperation with all worthy agencies now striving for the same end," and "indorses the policy of establishment of an adequate system of State parks, forests, and game refuges."

New Hampshire law for the control of the white-pine blister rust now provides that when in the opinion of the State forester and the commissioner of agriculture an emergency exists making it necessary to destroy the Ribes in any town the governor and council may order the town to carry out under the State forester's direction whatever control measures he specifies. If such an order is not complied with the State forester or his agents may remove or destroy the Ribes at the town's expense. The maximum expenditure that any town may be required to make under this act in any one year is set at \$400.

Purchase of more than 250,000 acres of land for State forest purposes has been authorized by the Pennsylvania State Forest Commission since June 1, 1929.

Michigan's forest fire law as amended this year authorizes fire wardens to enter upon any unimproved lands in order to construct and maintain permanent fire lines. It also authorizes the State director of conservation to enter into contracts with railroad companies, landowners, counties, and townships for the cooperative construction and maintenance of permanent fire lines. The duration of such contracts is limited to 10 years, and the department's financial obligation under them is limited to 50 per cent of the total cost of constructing and maintaining the fire lines.

Michigan Establishes Woods Laboratory for Study of Fire

A forested area of several thousand acres belonging to the State of Michigan has been set aside for the study of forest fire problems. The land is located within a few miles of Roscommon, in the sandy jack pine belt. In the studies to be conducted on it the Michigan Department of Conservation will have the cooperation of the Lake States Forest Experiment Station and the district forester of the Lake States National Forest District. The area is to be surrounded with a 300-foot fire line and divided into lots of from 20 to 40 acres. Fires will be set at different seasons and different times of day and under different weather conditions. Study will be directed principally toward determining how the incidence and spread of fire and the damage caused by fires are influenced by such factors as air temperature, air humidity, wind velocity, and the inflammability of duff. When an area has been burned over once or twice it will be studied with respect to reforestation by natural and artificial means. Fire damage to the second growth will be another subject of study. The experimental fires will be used for testing pumps, tools, chemicals, backfiring, and other apparatus and methods, and for the training of State fire rangers.

A sixth forestry district has been organized by North Carolina, with headquarters at Wilmington. W. C. Hammerle, formerly a ranger on the Cherokee National Forest, is in charge of forest fire control activities in the seven counties comprised in the district, as district forester.

Four hundred acres of land on Gogebic Lake, second largest inland lake in Michigan, has been given to the State and is being developed as the Gogebic Lake State Park.

Tree Production at the Amherst Nursery Mississippi Lumber Company Adopts Reforestation Plan

The Amherst Nursery of the Massachusetts Department of Conservation, John and Charles Palmer in charge, produces about 4,000,000 seedlings ready for transplanting every year. About 3,500,000 of these are sent to other State nurseries for transplanting and the remainder are transplanted in the Amherst nursery itself. About 500,000 transplants are turned out by the nursery annually. At the present time there are about 12,000,000 trees in the nursery. Northern white pine and Norway pine are the principal species.

This nursery uses a particularly successful method of transplanting. The transplant board used holds 30 trees. One man kneels with a bucket of trees, fills the board, packs the earth, and backs up to the next row. He doesn't move while planting a row. By this method a man has transplanted about 11,000 trees in an 8-hour day. The average is about 7,000 trees a day.

Three-ply tar paper has been used in the nursery for mulching white spruce for a number of years. This paper costs more to buy, but it lasts for years. can be used over and over again, and gives better results than the thinner paper ordinarily used for the purpose.

Connecticut Increases State Park Appropriations

Appropriations totaling \$610,144 have been made to the Connecticut Park and Forest Commission for maintenance and development of State parks in the 2-year period beginning July 1, 1929, which is \$400,000 more than the amount so appropriated two years ago. Appropriations for additions to State parks amount to \$175,000, the second largest sum ever granted to the commission for this purpose. Appropriations for State forestry work in the new biennium total \$345,000, or \$70,000 more than those made in 1927. The amount allotted for acquisition of land for State forests, however, remains at its former level of \$127,000 (of which \$27,000 is for executive expenses).

For the care of trees, shrubs, and other vegetation along State roads in the biennium the State highway department has received an appropriation of \$565,000.

Earl Keene, a farmer near Golden Hill, Dorchester County, Md., is reported by the Maryland Department of Forestry to have cut 62 cords of wood in 1928 from an area of less than 2 acres which he is positive was under cultivation in 1898. Since 1898 several cords of wood had been removed in thinnings.

The Gloster Lumber Co., Gloster, Miss., has set itself to the task of insuring perpetual operation of its sawmill by growing timber, the Mississippi Forest Service reports. F. A. Anderson, manager of the company, has been convinced of the possibility of profit from timber growing through his own observations on the growth of shortleaf pine. Not only is a reforestation plan being applied to the company's holdings of 100,000 acres in Amite, Wilkinson, and Adams Counties, but associate companies are being organized to purchase additional land for reforestation. One of these, the Southern Forest Products' Co., has purchased 21,000 acres of land for this purpose. Riders have been employed to patrol the land, and many families are being given the use of small farms rent free on condition that they watch for fires. Fox hunters also have been enlisted as volunteer fire guards, and in order to stimulate their interest the company has bought and released on the land a large number of foxes.

On its swamp holdings in Adams County the Gloster Lumber Co. is planting locusts and black walnuts.

New Jersey State forest sales and leases in the year ending June 30, 1929, brought in \$8,000, the State department of conservation and development reports. During the year 12 acres of southern white cedar on the Lebanon State Forest was thinned, this work concluding a cedar-thinning experiment that covered 26 acres of the forest and yielded products worth \$8,750. On individual acres of dense young growth, the commission reports, the value of the thinnings reached \$500.

Furniture manufacture ranks third among North Carolina industries, the State's department of conservation and development reports, being excelled only by the textiles and tobacco manufacturing industries in capital invested, number of wage earners, wages and salaries paid, value of product, and value added by manufacture. The origin of the industry in North Carolina took place about 1888, and was due to the presence of great hardwood resources.

The expenditure of \$161,050 on 26 Illinois State parks was made possible through the release of funds in August by the State administrative board, according to an announcement by Superintendent of Parks P. J. Hoffmaster. It is planned to spend \$20,000 of this amount on Hartwick Pines State Park.

Education and Extension

Pennsylvania Forestry Course Begins With a Year in the Woods

Students entering upon the 4-year course offered by the Pennsylvania State Forest School, in which the State forest school at Mont Alto and the forestry department of the Pennsylvania State College were recently merged, will spend the whole of their freshman year, including a summer session, at Mont Alto. The Mont Alto plant is situated at the edge of the 23,000-acre Mont Alto State Forest. In outlining the work of the freshman year the faculty announcement states that—

At the same time students are pursuing courses in botany, mathematics, mechanical drawing, compass surveying, mensuration, and silviculture, they will engage in all the activities of administering a large State forest, including timber estimating, seed collection and storage, nursery practice, fire line, road, and trail construction and maintenance, cleaning and thinning of growing stands of timber, portable sawmill operation, and similar projects. In addition, each student will learn to identify the trees and flowering plants of the region, and become acquainted with the animal and bird life of the forest.

The sophomore year, spent at State College, will be devoted to the study of fundamental sciences, English, surveying, soil science, forest ecology, and mensuration. The work of the summer following the sophomore year will include training in topographic surveying under the department of civil engineering, study of logging and milling operations and wood-using industries, practice in timber estimating and mapping, and silvicultural studies.

At the beginning of the junior year students will be permitted to choose among four courses which have been given the names "professional forestry," "lumber industry," "wood utilization," and "private forestry." Further opportunity for specialization will be given to students in high standing who have shown a natural aptitude for some special phase of forestry. The senior year will conclude with two months spent at Mont Alto, during which each student will prepare a written working plan for a large tract of timber.

A 2-year ranger course, conducted at Mont Alto, is offered to students who have had at least two years of high-school training or the equivalent. A summer course is included. In April of the second year, students will be assigned for practical training on national or State forests or with nursery companies, lumber companies, wood-using industries, or private

forestry concerns, according to their fitness and inclination.

This year the school has enrolled 78 freshmen in the 4-year course, the largest number it can accommodate, and about 20 first-year men in the ranger course.

Yale-Firestone Forest Survey of Liberia

By SAMUEL J. RECORD, Yale School of Forestry

G. Proctor Cooper, field assistant in tropical forestry at Yale University, returned to New Haven in August after nearly a year's investigation of the forests of Liberia, West Africa. This work was done by the Yale School of Forestry in cooperation with the Firestone Plantations Co., which is establishing extensive rubber plantations in Liberia. The clearing of large tracts of virgin timber afforded an unprecedented opportunity for study of forest conditions in West Africa. Since conditions in the Liberian forests are in many ways typical of those for hundreds of miles eastward the results of this study will apply to a vast region of tropical forests just now on the eve of exploitation for many kinds of timber other than mahogany.

Numerous sample areas were carefully laid out and all the trees on these areas were listed and measured. Hundreds of wood specimens were obtained, together with leaves, flowers, and fruits of the trees for botanical identification. Logs of 130 different species were hewed out and will be tested for strength and other properties in the Yale Forest School laboratory. These logs represent every degree of hardness and color from the white and punky "corkwood" to the flinty "red iron-bark." Boards of native manufacture will be tried out for their carpentry and furniture value.

Since so little is known in America about the flora of West Africa, I personally arranged last summer to have the trees and other plants identified at the Royal Botanic Gardens, Kew, England. Three sets of herbarium samples have been shipped to England—one for Kew, one for the Natural History Museum in London, and one for the Imperial Institute at Oxford. The returns already received indicate that the collections are of high scientific value. Trees are always much more difficult to obtain than the lower forms of vegetation, and are accordingly poorly represented in herbaria. When the final determinations are made, a number of duplicate sets will be distributed to important institutions in this country.

With the assistance of Rupert H. Drinkwater, of India, Mr. Cooper collected a series of birds from the tropical evergreen forest for Peabody Museum, at Yale. Since the natives call many of the birds by the same names as the trees in which the birds live or on the fruit and seeds of which they feed, identification of the "bird in the bush" is often a great help in identifying a tree. A collection of the forest insects, mostly butterflies and beetles, is now at Peabody Museum awaiting study and classification. Dried barks, leaves, and fruits from 75 of the trees that occupy an important place in native medicine and witchcraft are to be studied and analyzed by pharmaceutical chemists. Some of these plants contain very powerful and even deadly alkaloids which the natives use as poisons.

In connection with the "devil worship" which they cultivate the natives of Liberia entertain great veneration for certain trees, particularly for the "sass wood," or "king tree," and the "ge-ahn-de-pay." The bark of each of these trees contains a powerful alkaloid that is used with deadly effect in the "palavers" for testing persons accused of serious crimes. Very many of the trees and plants in the jungle have special uses in the life of the natives. One kind of tree leaves may be used as a vermifuge, another for dysentery, another as a poultice on a child's head to make the skull tough. A bark may contain a poison for killing fish or for poisoning arrows, or it may be considered a cure for leprosy or elephantiasis or even malaria and yellow fever. The juice from a leaf may be considered valuable as a remedy for conjunctivitis or as a dressing for cuts and ulcers, and the seeds or fruits of any given tree may in some parts of the country be held to aid in relieving the pains of childbirth or to stimulate the flow of milk. Though some of the concoctions of the witch doctors and "Zoe" women of the villages and clans are of very doubtful value, others have a definite therapeutic principle.

All the material brought back by Mr. Cooper was collected many miles inland. In moving it to the coast he made use successively of native porters, launches, and auto trucks.

The Liberian wood specimens bring the total in the Yale collections to 16,000, representing 1,650 genera of 170 natural families. This is by far the most extensive assortment of woods in the world. It represents nearly every country of the earth. More than 2,000 samples, many very rare, have been added since the first of this year from the West Indies, Mexico, Central and South America, Japan, Siam, Java, New Caledonia, Papua, New Guinea, Norfolk Island, Australia, and all parts of Africa. Yale is cooperating with Oxford in an expedition to East Africa, and with the Field Museum in an exploration of the forests of the Peruvian Amazon. The

specimens are being systematically studied by scientists and students at Yale, and selected lots are being sent to foreign institutions for special investigation.

Hawaii and Porto Rico Employ Extension Foresters

During the summer just past Hawaii and Porto Rico both acquired their first extension foresters. Theodore C. Zschokke, a graduate of the Yale School of Forestry who has had 13 years' forestry experience in the Philippines and 4 as assistant superintendent of forestry in Hawaii, is appointed to the Pacific post; the Porto Rico appointee is Charles Z. Bates, who was graduated from the Pennsylvania State Forest School and has served in Porto Rico for 9 years as planting specialist and assistant forester.

In Hawaii extension work will be directed toward the development of interest in reforestation and the promotion of forest planting for windbreaks, erosion control, and the production of fence posts and firewood. Demonstrations will be arranged through the county extension agents, planting stock being provided by the board of agriculture and forestry without charge to demonstrators whose requests are approved by the extension forester. In Porto Rico planting will form the main project on the farm forestry program, with emphasis on the replanting of the coffee cultural forests (69 per cent of which are reported to have been destroyed by the hurricane of September, 1928) and on the planting of windbreaks. For plantings to shade coffee plantations the extension service will distribute guama peludo (*Inga villosissima*) and guama negro (*Inga fastuosa*), species recently introduced from the coffee regions of Venezuela. These species, Mr. Bates writes, have no dangerous enemies in the form of insects or fungi and are superior in many respects to the guava (*Inga inga*) and guama (*Inga laurina*), hitherto generally used for this purpose in Porto Rico. It is expected that Government encouragement will have a marked influence in interesting the small coffee-forest owner in the advantages of a well-managed woodlot, of which he has hitherto shown little consciousness.



Eight hundred boys and girls of New Hampshire planted about 400,000 forest trees this spring. Extension Forester K. E. Barraclough reports. The State forestry department provided pine trees without charge to 4-H clubs and to high school departments of agriculture, allowing 250 apiece to boys and girls under 16 years of age and 500 apiece to those aged 16 to 21. The recipients were required to plant the trees, or help plant them, on lands of their parents or relatives.

Forestry at St. Lawrence University

Through a gift made by F. L. Carlisle & Co., St. Lawrence University, Canton, N. Y., is enabled to spend \$20,000 a year for 5 years for the advancement of forestry in the north country of New York State. The university has employed Floyd M. Callward, recently extension forester of Vermont, as its forester. Mr. Callward's primary duty will be to develop a forestry extension service, through which the university will assist organizations, clubs, schools, and individuals in reforestation work and will cooperate with county supervisors in establishing county forests under the provisions of the Hewitt reforestation act. He will give an elective nontechnical course in general forestry, with emphasis on northern New York conditions, which will include field trips.

This spring the university proved its willingness to practice what it preaches by planting on its own land about 70,000 Norway spruce, northern white pine, and Norway pine. It plans to plant about the same number of trees in the spring of 1930, and to establish a small demonstration nursery.

One Hundred Georgia High Schools Introduce Forestry Teaching and Acquire Demonstration Forests

Forestry has been added to the course of study of 100 Georgia high schools in which vocational agriculture is taught under the provisions of the Smith-Hughes Act, the Georgia Forest Service reports. A demonstration forest of about 10 acres has been leased for the use of each of the schools. The State forest service has surveyed and mapped each of these areas and made a plan for its management. Representatives of the service will visit the school forests two or three times each year and carry on various demonstrations. The State's vocational agricultural department has outlined a series of jobs to be done on the forests by the students. A summer camp is to be held each year for the training of selected students. Each student developing satisfactory proficiency in the work of the camp is to receive a certificate as vocational forester, recommending him for employment in nontechnical forestry work.



The public schools of Wallingford, Vt., have two forestry demonstration plots comprising about 6 acres of land. One plot located along the main highway north of the village was given to the schools for this purpose by H. J. Fales, chairman of the board of selectmen. Five thousand Norway pine 3-year transplants from the State nursery were set out on the plots this spring.

Research Fellows to Study Grouse and Quail

Research fellowships established by the Sporting Arms and Ammunition Manufacturers' Institute have enabled the University of Minnesota to begin a study of the cyclic fluctuations of ruffed grouse and the University of Wisconsin to begin a study of environmental relations of quail. In these studies it is intended to correlate the management of the game crop with that of timber and agricultural crops. Ralph King has been appointed to the Minnesota fellowship, to work under the direction of Royal N. Chapman. The Wisconsin fellowship has been awarded to Paul L. Errington, who will work under the direction of Leon J. Cole. H. L. Stoddard, of the Bureau of Biological Survey, will have advisory supervision over both studies.

Michigan Business Men Donate 4-H Club Planting Stock

A group of business men in Grand Rapids helped start the first 4-H forestry club in Kent County, Mich., last year by paying for 1,000 northern white pine and Norway spruce seedlings for each of 25 farm children. In the fall a check-up on the plantings revealed that the average survival was 87 per cent and that three boys had stands averaging 95 per cent. The success of the first year's work led the club's backers to renew their offer in 1929, with the result that 92,375 trees, including equal numbers of northern white pine, Norway pine, and Norway spruce, were planted by 98 children.

In Van Buren County, Mich., where a 4-H forestry club was formed in 1928 on the same plan, each member of the club wrote a letter to the Kiwanian who had provided him with planting stock. A planting demonstration by the State extension forester prepared the boys for the work of planting their trees. In the fall each member was required to exhibit two of his best trees in pots at the local fair.



A tree-planting ceremony was made a part of the annual 4-H club congress in Mississippi, this year as last, trees being planted by the south and north Mississippi groups on the campus of the State agricultural college in the presence of about 2,000 delegates. A talk on forestry club work was given at a club leadership session by Mrs. Edgerton, State supervisor of forestry education, and plans were laid for cooperation by club members in the woods fire prevention campaign to be conducted by the extension forester in September.

Louisiana 4-H Forestry Club Work

By ROBERT MOORE, Extension Forester of Louisiana

Two types of 4-H club forestry work are offered to Louisiana boys. The first calls for the protection of farm woodlands from fire by means of fire lines and signs, and for farm woodland improvement work. This type of work does not produce a direct monetary return unless thinnings are made and the product is sold to pulp mills or creosoting plants. Under the second plan the boys enroll in junior fire patrols that are a part of the State system of cooperative fire protection. Each patrol is responsible for preventing and suppressing fire on from 9,000 to 20,000 acres of forest land. Payment is made by the Louisiana Division of Forestry at the rate of 1 cent per acre. Each club makes a division of the money among its members, reserving 10 per cent for the club treasury.

In the season of 1927-28, the first year of the junior fire patrol work, four clubs had an area of 65,000 acres to protect. Two of the patrols were organized after the fire season was half over and the period of greatest hazard past; therefore the number of acres burned, 168, is not a fair index of the efficiency of the patrols. For that season the Louisiana Division of Forestry paid the junior patrolmen wages and bonuses totaling \$550.

The season of 1928-29 saw 50 boys organized in six patrols to care for 109,000 acres. The junior patrolmen were paid \$875 for their work. The Union Sawmill Co., Huttig, Ark., will pay \$200 of this amount, under an agreement with the Louisiana Division of Forestry whereby the State and the company agreed to pay equal amounts toward the protection of the company's holdings in Union Parish. The best record for a single patrol was the protection of an area of 9,000 acres with 34 fires and a loss of but 69½ acres.

During the year 1927-28 W. H. Sullivan, vice president and general manager of the Great Southern Lumber Co., gave \$500 to be used as prizes for forestry club work in Louisiana. With this money 2 boys were sent to the National 4-H Club Congress in Chicago, 5 boys were given trips to the plantations and nurseries of the Great Southern Lumber Co. at Bogalusa, La., and 40 boys were sent to their parish club camps for one week each. This year \$200 provided by the Louisiana Division of Forestry will be used as prize money for boys in forestry club work other than that of junior patrol.

Forestry club work for boys was not a new thing in Louisiana when 4-H forestry clubs were first organized there in 1927; in 1925 and 1926 boys' reforestation clubs were conducted by the Louisiana Division of Forestry.

Medals Available for Children's Forestry Contests

Bronze medals to be awarded in state-wide forestry contests of children have been made available by the American Forestry Association. The design, executed in bas-relief, represents the General Sherman tree and companion sequoias. In addition to the medal that is to be awarded in each annual State contest to the winning child, becoming the child's permanent possession, there is a larger one to be presented to the winning child's school or club. This will become the permanent trophy of any school or club that wins it three times.

The American Forestry Association will not participate in the planning or management of contests, leaving this to agencies such as State forest services, State forestry associations, and State colleges. The competition must be state-wide. It may be open to all public-school children or may be limited to high-school children or to Boy or Girl Scouts, 4-H clubs, or other juvenile organizations. The promoting agency is free to decide upon an essay, oratorical, tree planting, or other type of contest.

Agencies interested in arranging for the award of these medals in their States should address the American Forestry Association, 1523 L Street, Washington, D. C.



The National Council of the Boy Scouts of America, at its nineteenth annual meeting, held in New York in May of this year, adopted the following resolution:

Whereas the forests of our country are being destroyed four times as rapidly as they are being replaced, and human carelessness is responsible for 60 per cent of the property loss each year through forest fires, a loss involving millions of dollars; Be it

Resolved, That we recommend that the Boy Scouts assist in every way the United States Bureau of Forestry in its campaign for conservation, and that the Boy Scout troops engage in tree planting as a good turn to the Nation.



"A million hammer blows for the prevention of woods fires in Mississippi" was the part Extension Forester Lauderburn asked 4-H boys and girls to take in the observance in that State of Woods Fire Prevention Week, September 16-20. This much hammer work was expected to suffice to nail up the 51,028 posters which the State forest service distributed to the children. Each of the 20,000 club members in the State was expected to put up two of the posters, which warned of losses through woods fires and stressed the value of farm woodlands.

One Year's Progress of Southern Forestry Educational Project

In its first year the forestry educational project that is being carried on in Georgia, Florida, and Mississippi by the American Forestry Association and the forestry organizations of those States has reached audiences totaling 326,302 with lectures and motion pictures. These audiences included 207,469 children. Lectures and motion-picture showings have been given in 60 counties of Georgia, 32 counties of Florida, and 20 counties of Mississippi. This involved 77,913 miles of travel for the five lecture and motion-picture trucks being used in the project.

The project entered its second year in July of this year with six trucks in operation, an additional truck for use in Mississippi having been purchased with funds privately subscribed in Mississippi. To supplement the assortment of forestry motion pictures previously in use, which consists of seven films produced by the United States Department of Agriculture, the American Forestry Association has filmed in the southern pine belt a picture entitled "Pardners," which tells the story of how a small landowner can grow timber as a crop with the assistance of the State forester.

4-H Club Planting in Montgomery County, Tenn.

The black walnut is one of the crops proposed by County Agent G. C. Wright, of Montgomery County, Tenn., for profitable use of the many acres of land in the county that were once used for growing dark tobacco but are now idle. Each farm boy or girl

who joins Mr. Wright's 4-H forestry club plants 50 hills of walnuts, two walnuts to a hill. The nuts are planted about 2 inches deep, on land that although fairly fertile is not so situated as to be available for cultivation or pasture. The favored situations are in well-drained ravines, along fence rows, on rocky rough spots, and around farm buildings. Last fall 10 boys and 10 girls each planted the required 100 walnuts. The local Civitan Club has authorized prizes of \$15, \$10, and \$5 for the forestry club members making the best records in this project.

Mr. Wright intends to enlarge his tree-planting program for forestry club members to include the setting out of black locust seedlings on idle land formerly used for tobacco growing. Next spring club members will establish locust plantations of 250 seedlings each, setting the trees 6 feet apart each way. In some cases walnuts will be planted this fall at intervals of 36 feet and locusts interplanted in the spring.

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On the Sunfish Hills, in Pike County, Ohio, a profitable timber crop is being harvested for the second time in less than 30 years, Extension Forester Dean reports. The Breece Lumber Co. has installed a sawmill at Latham and is producing 100,000 board feet of lumber each week for use in rotary veneer work at Portsmouth. When the last big lot of oak, poplar, and chestnut was cut out of this region, about 20 years ago, a crop of young oak, chestnut, hickory, and yellow poplar was left. Where this young growth was protected from fire there are now being cut logs averaging 12 to 16 inches in diameter.

Forest Service Notes

Water by Motor for Stock Watering and Fire Protection

By DOUGLAS C. INGRAM, United States Forest Service

On the Deschutes and Ochoco National Forests, which border the "high desert" region of central Oregon, large areas of excellent summer range in the timber remained totally unused until within the past few years because they were without water for stock. The Fort Rock district of the Deschutes at lower elevations merges into a "desert," a high pumice-covered plain. Here, and on a portion of the Ochoco Forest, there is light to medium winter snowfall but no consequent water in summer. As the snow melts the water is absorbed by the loose pumice soil that overlies the porous lava rock, in some places to a

depth of many hundred feet, and for miles no evidence of water courses is found. In spite of these conditions the areas are covered for the most part with an excellent stand of mature western yellow pine averaging 14,000 board feet per acre, under which is found a luxuriant growth of secondary vegetation consisting mainly of bitter-brush (*Kunzia tridentata*), Idaho fescue (*Festuca idahoensis*), June grass (*Koeleria cristata*), wheat grass (*Agropyron spicatum*), and needle grass (*Stipa occidentalis*). Long periods of summer drought during which the humidity is excessively low make this material highly inflammable, and the areas are subject to destructive lightning fires. For years the Forest Service has sought means of reducing the fire hazard and converting this latent grazing resource into useful animal products.

As far back as 1908-9 the Government experimented in drilling wells on these areas. Except in one case, the drilling was unsuccessful. A plan was then proposed for tapping the high alpine Paulina Lakes, piping the water for some 25 miles, and distributing it over the dry territory to the south and east; but engineering difficulties involved in this project made the cost prohibitive. Finally, when roads had been built to facilitate the protection of the areas from fire, the problem of making this large body of excellent summer range available for pasturing sheep was solved through the use of the ubiquitous truck and portable watering troughs.

In 1918 an enterprising sheepman began hauling water some 10 miles to his dry range on the Deschutes area. A year or so later water hauling was started on Dry Mountain range on the Ochoco Forest. These examples proved so successful that others followed rapidly. Out of a total area of 402,096 acres wholly unused in 1916, to-day 306,000 acres is profitably used by livestock.

The water for this large body of dry range is supplied by 14 wells located in a semicircle on the borders of the area and southeast of it. The longest water haul is 29 miles, the shortest 4 miles, and the average about 8 miles. Four stockmen haul all or part of their water from irrigation ditches 18 to 25 miles from their range; three are supplied from the Government well at Cabin Lake.

Several different types of hauling equipment have been developed, from a 1-ton truck with a 250-gallon tank to a 3-ton truck having a 1,000-gallon tank equipped with a light centrifugal pump that is useful both for filling the tank and for emergency fire fighting. For four trucks having a tank capacity of 460 gallons each the cost averaged \$1,332.58 per truck. A set of nine metal watering troughs cost \$191.25, making the cost of the whole outfit total \$1,523.83. Capitalizing this investment over a 10-year period made a cost per head per month of 15 cents. The cost of hauling was found to average 5.2 cents per head per month. On long hauls costs were as high as 9.3 cents per head per month; on hauls of 8 miles or less they were held as low as 3 cents per head per month. All normal costs to the operator are fairly covered by 18 cents per head per month. Incidentally, the trucks are used on home ranges during the winter for hauling feed and supplies; only a part of the cost, therefore, is properly chargeable to water hauling.

Heavy trucks with 1,000-gallon tanks were found ordinarily too heavy for the loose dirt roads traveled, and stockmen generally are favoring a medium-weight truck with a tank capacity of from 300 to 450 gallons. Under prevailing conditions such an outfit can be loaded in from three to six minutes.

Galvanized-iron watering troughs are generally used in this work. They vary in size, but are usually 8 feet long, 14 inches deep, and 18 inches wide, and flare at the top so that they "nest" and are easy to move. Eight to twelve of these are placed near the camp and are filled with water while the sheep are away feeding.

Water hauling has converted what was once virtually a timbered desert into excellent summer range that supports 25,000 sheep and 3,000 cattle the summer long. Moreover, the lambs from this long-unused range weigh 71 to 93 pounds when marketed, and their fat is of that firm quality so desirable in the marketable animal. And water hauling coupled with grazing use bids fair to solve one of the knottiest problems of fire protection found on any forest of the Northwest.

Cattle are watered from stationary troughs located at or near the wells, but it is customary to haul water to the sheep, daily or on alternate days, and to move their watering troughs frequently. Some of the bands water at night, the filled troughs awaiting the sheep as they come into camp; the practice that appears to be best for both sheep and range, however, is noon watering, with nightly change of bedground and consequent frequent change of watering place. Constant change in the location of the watering troughs eliminates the danger of overgrazing around the watering place and other undesirable features of the use of a natural or long-established watering place.

In order to save delay in filling the tank trucks it is necessary to store water at the wells. This storage is also an asset in case of forest fire, as are the sheepmen's tank trucks. Experiments are now being made in storing additional water over the various range units so as to reduce the cost of hauling and make additional water supplies available in case of fire.

The amount of water consumed by the sheep on this type of range has been found to vary widely, largely in accordance with the type of feed being used, weather conditions, and management of the stock. Some herders insist that their flocks require water every day, while sheep in other bands seem content and do equally well when watered every second or third day only. Ewes with lambs ordinarily take much more water than dry sheep. Difference in requirements is illustrated in the case of one stockman with two bands using adjoining and similar range, one of 1,100 ewes with 700 lambs and one of 1,200 ewes with 1,100 lambs. The first band required 800 gallons of water per day, or 0.44 gallon per head per day; the second required 1,200 gallons, or 0.52 gallon per head per day. The average requirement for eight bands of ewes and lambs using the Deschutes range was 0.36 gallon per head per day, and on the Ochoco dry range the average requirement was 0.375 gallon

per head per day. For a band of dry sheep watered at the Cabin Lake well the average quantity used daily was 0.26 gallon per head.

With few exceptions one camp tender and water hauler has little difficulty in supplying the daily water needs of two bands of sheep, time being allowed for moving the camp and watering troughs to fresh feed.

This type of water development is an up-to-date version of "the house that Jack built." The extreme fire hazard necessitated the building of roads, roads permit the hauling of water, this makes possible the grazing of sheep, and the consumption of forage by the sheep reduces the fire hazard and encourages reforestation of the cut-over area.

Permit Requirement for National Forest Entry Made Necessary by Fire Danger

Orders issued in August by District Forester Kelley, of the Northern National Forest District, required that permits be obtained by all persons entering the Lolo, Missoula, and Bitterroot National Forests, Mont.; the Pend Oreille National Forest, Idaho; or portions of the St. Joe and Clearwater National Forests, Idaho, and the Jefferson National Forest, Mont. This restriction on public use of national forests in Montana and Idaho was made necessary by the very serious fire danger arising from continued dry weather, and by the carelessness still displayed by many forest visitors in the use of fire. Unlike previous orders prohibiting entrance to national forests except under permit, these orders were made to apply regardless of whether the person entering the forest intended to build a camp fire. The permit, which was issued by all local national forest officers, bore information as to the portion of the forest the bearer was authorized to enter and his purpose in entering the forest, and was conditioned on his compliance with a set of rules governing the use of fire on the forest. These rules banned smoking except at improved places of habitation and authorized camps. They bound the permittee to try to put out any fire he might discover and if he was unable to put it out to notify a ranger whose address was given on the permit.

Because of the critical forest fire situation throughout the Northwest, a closure order affecting all national forest lands in Oregon and all in Washington except the Snoqualmie and Mount Baker National Forests was issued by C. M. Granger, district forester of the North Pacific National Forest District, effective September 11. The order prohibited travel over trails and camping away from regularly established camp grounds along roads. This is the second time only that such an order has been issued.

Livestock Impounding Regulation Upheld

By D. F. McGOWAN, United States Forest Service

The validity of Forest Service regulation T-12, which provides for the disposal of domestic livestock found trespassing on national-forest land and not redeemed by the owners, is upheld by a Federal district court decree entered July 2, 1929, at Phoenix, Ariz.

Regulation T-12 provides that if domestic livestock found trespassing on national-forest land is not removed upon notice it may be impounded by the Forest Service. If the owner of the stock is known, written notice of the impounding is given him; if the owner is not known, notice is given by publication. In either case the notice indicates when and where the stock was impounded, describes it by brands and other means of identification, and specifies when and where it will be sold in default of redemption. To redeem their stock owners are required to pay all expenses incurred by the Government in advertising, rounding up, pasturing, and impounding the stock. Animals not redeemed by the owners are offered at public sale to the highest bidder, or are otherwise disposed of. Stock offered at public sale for which no bid is received by the Forest Service may be sold at private sale, or be condemned. If condemned it may be destroyed by forest officers.

In the spring of 1927 action was started by the Forest Service to rid the Apache National Forest ranges of trespassing stock. Notice of the trespass was given to the owners so far as these were known. Thereafter such of the trespassing stock as were not removed by the owner were impounded and notice of the impounding was given as required by regulation T-12. The impounded animals that were not redeemed by the owners were offered at public sale, and such of them as were not disposed of at public sale were offered at private sale. Among the unredeemed stock were three horses owned by one Conner Trammell. The Forest Service was unable to sell these horses. On July 1, 1927, the three horses were shot and destroyed by Ranger J. T. Fears, who was acting under instructions of the supervisor of the Apache National Forest.

On September 23, 1927, an information was filed in the superior court of Apache County, Ariz., by the county attorney charging Fears with maliciously, unlawfully, and wilfully killing a certain brown mare, the property of Conner Trammell, contrary to the laws of the State of Arizona. The information was filed under section 602 of the Penal Code of Arizona, which provides among other things that any person who kills any animal, the property of another, shall be guilty of a misdemeanor. A special prosecutor was

engaged to present the case against Ranger Fears and test the validity of regulation T-12.

The court held in substance that regulation T-12 was arbitrary and not justified by the general statute of Congress empowering and directing the Secretary of Agriculture to make rules and regulations for the national forests; that it was in contravention of the Constitution of the United States, which provides that private property shall not be destroyed, misused, or taken unless by due process of law. The court declared regulation T-12 unconstitutional and without any basis or foundation in law. Fears was found guilty and was fined \$1. Thereupon the case was appealed by Fears to the Supreme Court of Arizona.

On March 19, 1928, the Supreme Court of Arizona reversed the superior court for Apache County, holding that as Fears was an employee of the Forest Service and in shooting the horse was obeying a regulation promulgated by the Secretary of Agriculture he could not be held guilty under the Arizona statute of killing the animal maliciously. The supreme court did not pass upon the validity of regulation T-12, but did direct that Fears be discharged.

In the meantime, at the instance of the Forest Service, an action was brought by the United States in the Federal court for Arizona against the county attorney and sheriff of Apache County to enjoin and restrain them from enforcing or threatening to enforce section 602 of the Penal Code of Arizona so far as it concerned the operation and enforcement of regulation T-12 on the national forests, and asking that this section 602 be adjudged null and void and of no effect so far as it concerned the operation and enforcement of regulation T-12.

On January 12, 1928, Federal Judges Ross, McCormick, and Jacobs, sitting at Los Angeles, Calif., issued an injunction granting temporarily the relief prayed for by the United States. On July 2, 1929, Judge Jacobs made the injunction permanent.

The decree granting the perpetual injunction states that regulation T-12 is a lawful exercise of Federal authority, the laws of Arizona to the contrary notwithstanding; that section 602 of the Penal Code of Arizona is not applicable to the United States and its officers and employees engaged in disposing of livestock impounded under regulation T-12, and that the said section 602, if applied in such circumstances, is contrary to the Constitution and laws of the United States and is void. The portion of the decree granting the perpetual injunction reads as follows:

That a writ of perpetual injunction be and the same hereby is granted, and the clerk is hereby ordered to issue the same, restraining and enjoining the defendants Dodd L. Greer, as county attorney of Apache County, Ariz., and M. L. Hall, as sheriff of Apache County, Ariz., their deputies, agents, servants, employees, successors, and all persons acting for them

or under their direction or in their behalf, and each and all of them, from interfering with complainant, its officers, agents, and employees in the enforcement of the said impounding regulation T-12 and from enforcing or applying, or threatening to enforce or apply the laws of the State of Arizona, and particularly section 602 of the penal code thereof, against complainant, its officers, agents, or employees, so far as concerns the operation and enforcement of said regulation T-12 on the lands of the complainant in the Apache National Forest in Apache County, State of Arizona, and from arresting and prosecuting the officers and agents and employees of the complainant under said section 602 of the Penal Code of the State of Arizona, or attempting or causing the arrest or prosecution of said officers, agents, or employees of the complainant engaged in rounding up, impounding, selling, disposing of, condemning or destroying under said regulation T-12 domestic livestock found trespassing on said Apache National Forest, in the County of Apache, State of Arizona.

The litigation in State and Federal courts that comes to an end with this important decree was handled for the Forest Service by District Law Officers E. S. French and H. P. Dechant.

French Faces Made Quickly with New Turpentine Tool

By LENTHALL WYMAN, United States Forest Service

A new turpentine tool developed by the Southern Forest Experiment Station for chipping French faces speeds up the work to such a degree that two French faces can be made in the time required to make one American face. In tests made by the station last year at Starke, Fla., the narrow French face, which is desirable from the standpoint of timber conservation, showed a distinct advantage over the American face in yield. The yield was nearly 20 barrels of spirits per crop. In these tests, however, in which the chipping was done with the tool generally used in France, despite the increased yield the operation was unprofitable because of the low current prices for naval stores and the high labor costs. With the French hack a considerable number of strokes are required to make the face and the process is rather slow. With the new hack fewer strokes are necessary to make a face. This tool requires a stroke similar to that used with the American hack, and unskilled laborers easily learn to use it.

With no greater scarring of the tree the two French faces give higher yields than one American face, and they heal over more quickly. The rate of yield per crop from trees chipped with pairs of French faces is about 40 barrels of spirits or better, which makes the operation profitable even in times of low prices. A new arrangement of gutters and aprons permits the use of a single cup to collect the gum from as many as three French faces, which reduces initial expense and overhead.

National Forest Receipts

Receipts from the national forests reached a higher level in the year ending June 30, 1929, than in any preceding year, totaling \$6,299,801. The gain over the receipts of the fiscal year 1928 amounted to \$858,201. Sales of timber and turpentine brought in \$4,099,966; livestock grazing fees, \$1,726,253; permits for special uses of land included in the forests, \$287,119; and water-power permits, \$113,227. The amounts received in the form of fines for trespass included \$47,063 collected from persons found to be responsible for starting forest fires.

The share of national forest receipts of the fiscal year 1929 that will be turned back by the Federal Government to the counties in which the forests are situated, for roads and schools, will be approximately \$1,605,882, or about \$200,000 more than the amount so paid for any previous year.

Technical Grazing Personnel in the Forest Service

By W. R. CHAPLINE, United States Forest Service

It was 22 years ago that technically trained grazing men were first appointed to the Forest Service. The first appointees were James T. Jardine and Arthur W. Sampson. A little later C. E. Fleming, W. A. Dayton, and A. E. Aldous were added. Some other additions were made in 1911, and a considerable number were made in 1914. The war depleted the ranks, and in 1919 it became necessary for the service to go back almost to the beginning in building up a technical grazing personnel. At the end of June, 1929, however, the Forest Service personnel included more than 100 men who had passed the civil service examination for junior range examiner (formerly grazing assistant).

Of these men 14 are in research positions and the remainder are in administration. The latter group includes 1 man in the Washington office and about 11 in the district offices, 10 supervisors, 8 assistant supervisors, 16 other technical specialists on supervisors' staffs, and a number of rangers. Only 16 of the administrative men took the examination before 1920.

The question is often raised whether the civil service examination provides a useful indication of a man's ability. While there is no question but that some men fail to give a just representation of their abilities in an examination, in analyzing the records of 100 of our grazing men as to development, advancement, and grade of work I find that these records have usually borne out the ratings given in

the junior range examiner examinations. My analysis covers nearly all the Forest Service men who passed the examination in the 12-year period 1915-1926, including as many as possible of those who have now left the service. Men who entered Forest Service grazing work before 1915 were omitted because they have all had a much better than average chance to advance; those who have entered since 1926, because there has hardly been time for a thorough test of their ability. A few men were ruled out of consideration because their records were not clear or because I did not know their work well enough to rate it. The men were classified into four arbitrary grades: (1) exceptional, (2) better than average, (3) average, and (4) below average.

Each eligible list was divided on the basis of examination grades into first and second halves. Of the 53 men who were in the first half of their respective lists and who could be rated, in my judgment 11, or 20 per cent, have proved exceptional; 39 (including the 11 exceptional men), or 74 per cent, have proved better than average; and 51, or 96 per cent, have proved average or better. Only 2 in the upper half have proved to be below average. Of the 47 men in the second half of the list who could be rated, 2, or 4 per cent, have proved exceptional; 16, or 34 per cent, better than average; and 30, or 64 per cent, average or better. The remaining 17 lower-half men fell below average in accomplishment.

Doubtless two of the most important factors in the advancement of technical grazing men have been the demand for men trained in range management and the fact that, until recent years, most of the men entering from the examination were given at least a year of experience in grazing reconnaissance and management-plan development under the supervision of a trained man. Other important factors have been the personal interest shown in the development of these men by the grazing men of the district offices and the help and encouragement afforded them, particularly in their early years in the service, by close inspection of their work.

Reproduction on Cut-Over Spruce Lands

In a study covering several hundred sample plots in the spruce lands of the Northeast, the Northeastern Forest Experiment Station has found cut-over lands generally well stocked with spruce and fir reproduction. Nearly all the reproduction had been present in the stands prior to cutting. The quantity of reproduction was greater in the spruce-flat type than in the spruce-hardwood type, and greatest in the spruce-slope type. In general, the largest number of spruce and fir seedlings were found on the areas

that had originally supported the largest volume of spruce and fir.

Competing hardwood growth is the most disturbing single factor operating to prevent the final establishment of spruce and fir on cut-over spruce lands. Where beech and sugar maple form an appreciable portion of the stand any type of cutting, unless it is followed by special cultural treatment, results in rapid encroachment of hardwoods on areas formerly occupied by spruce and fir. Clear cutting of spruce and fir halts additional restocking of these species for many years following cutting, whereas prolific seeding of large residual hardwoods results in the establishment of much additional hardwood growth. In some instances promiscuous cutting of young growth may be chiefly responsible for the conversion of former mixed spruce and hardwood stands into pure hardwood stands.

Changes resulting from clear cutting are found to result in the dominance of fir over spruce, although in the undisturbed forest the spruce maintains its dominance without much difficulty.

A Cold Tub for Lodgepole Poles

A cold bath of creosote is better than a hot one for treating telephone stubs cut from standing dead lodgepole pine. Ranger H. R. Elliott reports after two years' experience in creosoting such stubs at the Bear Valley Ranger Station, Malheur National Forest, Oreg. If heated the creosote soaks clear to the center of the stub for a foot or more from the bottom before it penetrates the remainder of the treated portion of the stub to the required depth of 1 inch. The cold-bath method takes a little more time but gives more even penetration, producing equally good results with a saving of about one-third of the creosote required by the hot-bath method.

Stubs cut from standing dead western larch will not take the creosote, Ranger Elliott finds. A tankful of larch stubs that were cooked for 10 hours and left in the creosote three days longer showed only from $\frac{1}{2}$ -inch to $\frac{1}{8}$ -inch penetration.



Hunters licensed by the State of Arizona this year have permission to kill deer on the Kaibab National Forest, Ariz. Under an agreement of the Arizona Game and Fish Commission and the United States Forest Service each hunter will be permitted to kill two deer, only one of which may be a buck, within the period October 1 to December 15. A fee of \$1.50 is to be paid to the Forest Service by each person entering the forest for the purpose of hunting and killing deer.

Good Stands on Old Indian Village Sites In Alaska

By R. F. TAYLOR, United States Forest Service

With the advent of the white man in southeastern Alaska many Indian villages were abandoned, the villagers being drawn away to a more exciting life in the towns of the whites. These old village sites are now covered by second-growth forest stands, in many cases of excellent quality, presenting examples of the type of stand that might be approached if complete utilization were effected on timber sales and the soil well broken up.

The forests of Alaska have a raw humus layer somewhat similar to that of Scandinavian forests. As Hesselman points out, if such a forest is clear cut and the cut-over land is allowed to lie uncovered this acid mat quickly decomposes and nitrogen formation takes place. This is not absolutely necessary for natural regeneration, but results in better growth. On the Indian village sites, exposed to light and insolation for many years during occupation and then abandoned to regenerate, this treatment has brought about not only better growth of the new stands but a desirable change in composition of stand, with higher percentages of Sitka spruce and lower percentages of the less exacting western hemlock. When I commented on this to a tourist he replied, "Well, now, ain't it the truth that hundreds of them Indians are buried back there under them trees?"—If this is part of the explanation we can not hope to duplicate such stands!

The Airman's Cigarette Butt is Dangerous

Burning cigar or cigarette butts dropped from airplanes in motion may be a source of forest-fire danger, according to Forest Service experiments carried out in June of this year at Spokane Airport, Spokane, Wash. The tests were made in clear weather, when the air temperature was about 75°, relative humidity about 34 per cent, and wind movement about 7 miles an hour. The cigarettes used were factory made, with plain tip. Both they and the cigars were of brands in common use. The butts were thrown from a forest-patrol plane at altitudes of approximately 500 feet and 1,000 feet above ground. To enable observers to trace the butts in their fall a streamer of bright-colored cotton cloth, 2 to 3 feet long and about 1 inch wide, was attached to each. Of six cigar butts dropped five were recovered. Every one of these was burning when picked up from the field. Six out of seven cigarette butts were recovered, and of these four were still burning when picked up.

Flight of Douglas Fir Seed

Even when the seed crop is light, a typical stand of Douglas fir in the Northwest may scatter a good proportion of its seed to a distance of 800 feet over adjoining cleared land, according to a count made by Leo A. Isaac of the Pacific Northwest Forest Experiment Station. The count was made near Wilark, Oreg., on rolling ground between the Columbia and Upper Nehalem Rivers. Rodent-proof seed traps 4 feet square were placed on the cleared land at 100-foot intervals, lined in the direction in which the wind most commonly blew during the fall and winter. The timber was a typical stand of Site II thrifty Douglas fir with a light mixture of hemlock and cedar.

It was approximately 225 years old and 210 feet in height. Cutting and slash burning had taken place in the four years preceding the study. At a distance of 100 feet from the edge of the timber a distribution of 40,600 sound seed per acre was indicated; from that point to a distance of 800 feet, the fall of sound seed was found to range from 17,000 to 3,000 per acre. The seed production of hemlock and cedar was very slight during the year of the study, and all but a small percentage of the seed caught in the traps was of Douglas fir. Seed fall started about September 1, and 88 per cent of the sound seed collected were found in the traps before the end of October; sound seed were found, however, as late as April of the following spring.

General Forest News

Silviculturists of Many Nations Meet at Stockholm

(From a report by EDWARD N. MUNNS, United States Forest Service)

The seventh congress of the International Union of Forest Experiment Stations, which except for the outbreak of war would have taken place in Hungary in 1914, was held with marked success in Stockholm, Sweden, July 21-27, 1929. This was the first meeting of the union since 1910, when it convened in Brussels. About 180 delegates attended, representing the following countries: France, Spain, Denmark, Holland, Italy, Germany, Switzerland, Russia, Poland, Finland, Norway, Japan, Bulgaria, Egypt, Chile, Rumania, Czechoslovakia, Austria, Hungary, Yugoslavia, Greece, Estonia, Latvia, Java, India, Canada, Scotland, South Africa, Cypress, England, Belgium, Australia, Portugal, Sweden, the United States.

Henrik Hesselman, head of the Swedish Forest Experiment Institute, was president of the congress and chairman of the organization committee. French, German, and English were the official languages. The meeting place was the college of forestry.

A new constitution was adopted, reorganizing the union to include in its field all forest research, admit all organizations engaged in forest research, offer membership to individuals, and appoint a permanent secretary and a permanent executive committee.

The question of an international forestry bibliography was one of the important subjects discussed. A committee of five headed by Professor Oppermann, of Copenhagen, was appointed to work for a uniform classification of forestry literature. Each country

is asked to publish the bibliography of its own forestry literature down to 1930 and to send in annually to the secretary of the union a list of papers published during the year. Library cards in the official languages of the union are to be prepared for subscribers. Objects toward which the union will work include bringing together information on field technique used in forest research and correlating such information so as to facilitate adoption of practices best suited to local conditions, and encouraging the use of seed of known origin for forest planting.

The permanent committee elected to take charge of the affairs of the union for the next three years consists of Philibert Guinier, Nancy, France, president; Gyula Roth, Sopron, Hungary, vice president; Ludwig Fabricius, Munich, Germany; R. C. Robinson, London, England; Aldo Pavari, Florence, Italy; Henri Badoux, Zurich, Switzerland; Wladislaw Jedlinski, Warsaw, Poland. The permanent secretary chosen to serve during the same period is Sven Pettrini, of the Swedish Forest Experiment Institute.

Both before and after the week of meetings, visiting foresters were conducted on excursions to the Swedish experimental forests, State forests, and private forests, and to woodworking plants. These gave an opportunity to see much of what the Swedish foresters are doing in all lines of silvicultural work, and many kinds of devices used in logging and forestry practices. With wonder the delegates from the United States and other "backward" nations traveled through a country where half the land is forested, and nearly all forests are under management, where the rivers are full of logs and yet the woods, largely untouched by fire, look as if they had not been

touched by human hand or foot. These trips, like the meetings, proved Doctor Petrini a genius for organization. Confusion and delay were unknown, and the delegates' baggage found its way about with magical precision.

Americans attending the congress included Henry I. Baldwin, Brown Co., Berlin, N. H.; P. R. Gast, Harvard University; Joseph Kittredge, jr., Lake States Forest Experiment Station; Barrington Moore, Ecology, Washington, D. C.; Edward N. Munns, Office of Forest Experiment Stations, United States Forest Service; Alfred J. Stamm, United States Forest Products Laboratory; James W. Toumey, Yale School of Forestry; S. A. Waksman, New Jersey Agricultural Experiment Station; and K. W. Woodward, University of New Hampshire.

The next meeting of the union will be held in France in 1932, and the next following that will be held in Hungary in 1935.

Mississippians Incorporate to Grow and Market Timber

From Starkville, Miss., comes news of the organization of a stock company for the purpose of growing and marketing timber. The company, known as the Southern Forest Preserves (Inc.), has an authorized capitalization of 5,100 shares, of which 100 are 7 per cent noncumulative preferred and 5,000 have no par value. The charter lists the principal purposes of the company as "to encourage the preservation, propagation, culture, and growth of timber; to practice selective cutting, clear cutting, and other methods of cuttings, and marketing of timber at times and places and under such conditions deemed advisable by its governing authorities; to own, control, and manage tracts of woodlands and other lands and to lease the same." As a secondary activity is mentioned the practice of agriculture on cultivable portions of lands that may be acquired by the company.

Among the incorporators are H. O. Jones, secretary of the Starkville Chamber of Commerce, and D. E. Lauderburn, State extension forester.

Michigan Kiwanis Forest Plantation Now Covers 10,000 Acres of Government Land

Kiwanis clubs of Michigan, who paid last year for the labor required to plant trees on 5,000 acres of the Huron National Forest, Mich., did not feel that they had done too much for reforestation when they footed a bill for \$9,700. This year they paid for the planting of another 5,000-acre tract on the national forest, and they express the hope to provide for addi-

tional planting in coming years. On August 30 representatives of the State and Federal Governments met with Kiwanians to dedicate the 10,000-acre Michigan Kiwanis Forest Plantation, which is located near East Tawas, Mich.

Bernheim Forest Established in Kentucky

Thirteen thousand acres of Kentucky land 25 miles south of Louisville has recently been placed under forestry management as the private estate of Isaac W. Bernheim. Mr. Bernheim, now a resident of Denver, was in business in Louisville for 50 years and has long planned to establish in Kentucky a forested estate such as those of his native Germany. The land lies in Bullitt and Nelson Counties, on the Springfield branch of the Louisville & Nashville Railroad, and has its northern boundary near Clermont.

In preparation for developing the estate the committee acting for Mr. Bernheim had a study made of the area by John Lafon, consulting forester of Vancouver, B. C., who is a native of Kentucky. Mr. Lafon described the tract as mostly knob land, with long, low ridges separated by valleys. Until about 40 years ago it was heavily timbered with mixed stands of oak, hickory, ash, poplar, walnut, and beech, with pine growing on the poorer soil on dry ridges. Practically all the merchantable timber has now been cut. In spite of repeated fires, there remains a fair stand of young timber. The humus layer that formerly overlaid the yellow clay soil has been either burnt or washed away. On the average the soil is not very deep.

Ronald B. Craig, a graduate of the New York State Forest School who has had experience in Government forestry work, was employed as forester for the estate, and organized a permanent fire patrol of seven men. Farmhouses at various points on the tract have been put to use as stations and living quarters for these men, and are being connected by telephone with a 47-foot steel observation tower that has been erected on the highest point on the estate. Thirty-foot firebreaks have been cut through parts of the property. The whole estate is to be fenced and closed to hunting.

Management plans call for the removal of defective trees and trees of less valuable species, and for the planting of trees on 1,110 acres of abandoned and eroded farm land. Fertile fields along Wilson Creek will be cultivated to form a natural firebreak and to provide employment for tenants.

After about a year, when roads and trails have been sufficiently developed, the estate will be opened to the public for recreational use. It will be maintained perpetually, under the Isaac W. Bernheim Foundation (Inc.), as a forest and a wild-life sanctuary.

Another Big Year for the Wood Preservers

Statistics compiled by R. K. Helphenstine, jr., United States Forest Service, on the quantity of wood treated and wood preservatives used in the United States in 1928 embody reports from all the 193 wood-preserving plants that were in active operation in this country during the year. This is the twentieth consecutive year in which such statistics have been compiled by the Forest Service in cooperation with the American Wood Preservers' Association. The number of plants in operation was greater by six in 1928 than in 1927. It included 125 plants of the pressure cylinder type, 55 nonpressure (open-tank) plants, and 13 plants equipped for both pressure and nonpressure treatment. New plants constructed in 1928 numbered 10.

In 1928 the 193 plants gave preservative treatment to 335,920,379 cubic feet of wood. This is 9,765,425 cubic feet less than the quantity they had treated in 1927, but 46,598,300 cubic feet more than they had treated in any other preceding year. Decreases from the record-breaking figures of 1927 were shown by crossties, wood blocks, and switch ties. In 1928 the plants treated 210,343,215 cubic feet of crossties as compared with 222,695,520 cubic feet in 1927; 3,676,312 cubic feet of wood blocks as compared with 5,271,420 cubic feet in 1927; and 14,533,450 cubic feet of switch ties as compared with 15,200,934 cubic feet in 1927. The decrease in the volume of these products treated was partially compensated by an upward trend in the quantities of wood treated in the form of construction timbers, piling, cross arms, and poles.

Of the 70,144,405 crossties treated in 1928 more than 58 per cent were adzed or bored or both in advance of preservative treatment.

Although the plants treated a smaller quantity of timber in 1928 than in the previous year, they used a greater quantity of preservative material. The creosote used amounted to 220,478,409 gallons, which was an increase of 699,979 gallons over the previous high record of 1927. The 25,075,903 gallons of petroleum¹ used represented an increase of 2,164,769 gallons over the quantity used in 1927, and the 23,524,340 pounds of zinc chloride used was 1,361,622 pounds more than the 1927 consumption. Treatment of wood paving and flooring blocks required 2,347,518 gallons of paving oil in 1928, whereas in 1927 only 1,389,465 gallons of this preservative was so used.

In 1928 domestic creosote made up 62.8 per cent of the total quantity used by the wood-preserving plants, as against 58.6 per cent in 1927.

¹ All the petroleum used was employed as a diluent for creosote. Petroleum was used principally in the treatment of crossties and switch ties.

The distribution of the 207 wood-treating plants in existence in the United States at the close of 1928, by classes and types, was as follows:

Location	Commercial plants ¹			Railroad plants ²			Private plants ³			Total
	Pressure	Nonpressure	Pressure and nonpressure	Pressure	Nonpressure	Pressure and nonpressure	Pressure	Nonpressure	Pressure and nonpressure	
Region No. 1:										
Maine.....		1								1
New Hampshire.....	1	1					1			3
Massachusetts.....	1	1		1						3
Connecticut.....	1						2			3
New York.....	3						1			4
Pennsylvania.....	3			3			3	1	1	10
New Jersey.....	3			1						4
Maryland.....								1		1
Virginia.....	4	4		1						9
West Virginia.....		1		1						2
Total.....	16	8	0	7	0	0	3	5	1	40
Region No. 2:										
Kentucky.....	2			1						3
North Carolina.....	2	1		1						3
South Carolina.....	1									2
Tennessee.....	2	1						1		4
Georgia.....	5		1	1			1			8
Alabama.....	4		1				1			6
Florida.....	2			2						4
Mississippi.....	8			1			1			10
Louisiana.....	9						1			10
Texas.....	6			3						9
Arkansas.....	1							1		2
Oklahoma.....	2			1						3
Total.....	44	2	2	10	0	0	4	1	1	64
Region No. 3:										
Ohio.....	6	3						1		10
Michigan.....		2	1	2				1		6
Indiana.....	6									6
Illinois.....	9		1	1				2		13
Wisconsin.....	2									2
Missouri.....	3									3
Minnesota.....	1	10	1	1						13
Total.....	27	15	3	4	0	0	0	4	0	53
Region No. 4:										
Montana.....				2				1	1	4
Wyoming.....				3						3
Idaho.....		7				1	1			9
Colorado.....	1		1					1		3
Arizona.....							3	1		4
New Mexico.....				2						2
Total.....	1	7	1	7	0	1	4	3	1	25
Region No. 5:										
Washington.....	4	6								10
Oregon.....	1	2			2					5
California.....		3		2	1		4			10
Total.....	5	11	0	2	0	3	0	4	0	25
Grand total.....	93	43	6	30	0	4	11	17	3	207

¹ Plants that treat wood for sale or by contract.

² Plants owned by railroads and operated by them mainly for the treatment of railroad material.

³ Plants owned by light and power companies, mining companies, etc., and operated by the companies to supply their own requirements.

The Metropolitan Park Board of Cleveland, Ohio, this spring set out 100,000 forest trees in permanent location on the lands under its control and transplanted more than 300,000 seedlings in its nursery.

Railroad Stops Locomotive Fires

The number of fires caused by locomotives or steam shovels in the woodlands of the Lehigh Coal & Navigation Co., near Lansford, Pa., stood at zero in 1928 and in the spring fire season of 1929, according to a report of the company's forester, A. C. Neumuller. The company has 97 locomotives and steam shovels in operation daily in and near its 25,000-acre woodlands, and about 27 additional locomotives are operated in and near them by railroad companies. In 1916, 106 fires were caused on these lands by locomotives and steam shovels, constituting 64 per cent of all fires on the lands. A gradual reduction in the number of fires so caused has rewarded the company for rigidly inspecting spark arresters during fire seasons, carrying on fire prevention educational activities with its own employees and with sportsmen and others, and in the past seven years constructing approximately 20 miles of safety strips which are burned every spring.

For fire-suppression purposes this company has organized fire crews at its collieries and maintains a trained force of forest rangers which it can transport rapidly to all fires.

Railroad Reduces Damage Claims by Fire Protection Campaign

By JOHN L. COBBS, Jr., Atlantic Coast Line Railroad Co.

The amounts paid by the Atlantic Coast Line Railroad Co. as damages for fires originating on or near its right of way have fallen off greatly since the summer of 1927, when the company instituted its campaign to prevent and suppress fires. At that time a set of rules was issued to the road's employees designed to minimize fire danger from the operation of locomotives, from disposal of fuels and ashes, and from burning of waste materials. It was ordered that the right of way be kept clear of inflammable material. Placards were placed in the smoking compartments of coaches warning the public against throwing lighted smoking materials from train windows. Train crews were instructed to report all fires seen on or near the right of way to the nearest agent or section crew. Agents were instructed to make reports of any fires coming to their notice to the nearest section crews, to fire wardens of the States in which the fires occurred, and to the company's chief claims attorney. Section crews were required to extinguish fires reported to them and to cooperate with members of the State forest services whenever possible. The practice was adopted of having a claims examiner go to the scene of each fire as soon as the fire was reported in order to obtain statements

from persons having knowledge of the facts in the case and establish whether or not the railroad was responsible for the fire.

During the first 12 months of the campaign payments of fire damages were reduced to less than one-seventh of the amounts that had been paid during the preceding year. During the second year further progress was made: up to June 1, 1929, payments amounted to only about 6 per cent of the losses for the corresponding period in 1926-27. (The latter figure is subject to slight change as pending claims are settled.) During the first year of the campaign weather conditions were very favorable; during the second year they have been normal.

The reduction in damages paid is attributed by the company largely to more accurate determination of responsibility for the origin of fires occurring on or near its right of way. Heretofore, officials of the company believe, the company has paid fire damages in many cases in which the claims against it were unfounded, especially in instances in which claims arose so long after the fire that determination of the starting point of the fire was impossible.

Rules for the Hygiene of Portable Pumps

No portable pump ever got along well—

(1) On a diet of gasoline alone. The 2-cycle pumper needs a sweetening of oil, well mixed with the gas.

(2) With sand in its circulatory system. Keep the end of the suction hose suspended at least a foot above the bottom, or, if the sump is shallow, place the end of the hose in a can or on a submerged sheet of canvas.

(3) With a gummy carburetor. When discontinuing use, shut off the gas at the tank and let the engine drain the carburetor dry.

(4) With "frozen" rotors. Drain the pump dry and pour a little oil into it (rotating it by hand afterwards) before putting it away.



Twenty-five years' use has worn out the rails of street-car tracks on Main Street, Memphis, Tenn., but has left no sign of decay or deterioration on the pine ties that carry the rails, the Southern Pine Association reports. The steel rails, laid in 1904, are now being replaced, but the ties are merely being turned over. J. H. Haylow, chief engineer of the Memphis Street Railway Co., anticipates that they will give 25 years' more service. These ties were among the first to be treated with preservatives at the plant of Ayer and Lord at Grenada, Miss.

Dawes Wood

A 293-acre tract of forest land in central Ohio has been set aside by Mr. and Mrs. Beman G. Dawes as an arboretum controlled by a self-perpetuating board of trustees. Mr. Dawes is chairman of the board of directors of the Pure Oil Co. and a brother of Ambassador Charles G. Dawes. The new arboretum, known as Dawes Wood, is situated about 9 miles south of Newark, Ohio, on State Highway No. 13, a highly improved roadway connecting Lake Erie and the Ohio River, and 2 miles north of the National Pike or Cumberland Trail, United States Route No. 40. The purpose of its establishment is stated in the deed as follows:

To encourage the planting of forest and ornamental trees and to demonstrate the value of the different varieties of trees for these purposes; for practical and scientific research in horticulture, but particularly in the growth and culture of trees and shrubs able to support the climate of the State of Ohio, and to increase the general knowledge and love of trees and shrubs and bring about an increase and improvement in their growth and culture.

It is planned through the planting of individual trees in the arboretum to establish memorials to distinguished men.

The tract is reported to represent many different kinds of soil and to support a stand of timber including more than 100 native tree species and varieties.

A White Pine to Read About

Thirty logs making up a total of 6,255 board feet of timber were cut from a white pine felled in 1912 by George H. Jones at New Durham, N. H. Above 21 feet the tree divided into three prongs. Figures for the length and content of the logs were recorded by Mr. Jones as follows:

	Length	Content
	<i>Feet</i>	<i>Board feet</i>
3 logs.....	16	1, 890
4 logs.....	14	1, 140
9 logs.....	12	1, 610
6 logs.....	10	745
3 logs.....	9	555
4 logs.....	8	90
1 log.....	5	225
Total.....		6, 255

President Hoover Specifically Excludes Forests and Parks from Public Lands Disposal Policy

In his letter in regard to the Public Domain lands and the Reclamation Service, addressed to Assistant Secretary of the Interior Joseph M. Dixon, and read before the Conference of Governors of Public Land States, Salt Lake City, August 26 and 27, President Hoover specifically excluded forests, parks, and Indian reservations from his tentative plan for the disposal of public lands. Those parts of the letter which refer to the forests read as follows:

The most vital question in respect to the remaining free public lands for both the individual States and the Nation is the preservation of their most important value—that is grazing. The remaining free lands of the public domain (that is, not including lands reserved for parks, forests, Indians, minerals, power sites, and other minor reserves) are valuable in the main only for that purpose.

The first of the tentative suggestions, therefore, is that the surface rights of the remaining unappropriated, unreserved public lands should, subject to certain details for protection of homesteaders and the smaller stockmen, be transferred to the State governments for public-school purposes and thus be placed under State administration.

At the present time these unappropriated lands aggregate in the neighborhood of 190,000,000 acres and in addition some 10,000,000 acres have been withdrawn for purposes of stock watering places and stock drives which might be transferred as a part of a program of range preservation. In addition, some 35,000,000 acres have been withdrawn for coal and shale reserves, the surface rights of which with proper reservations might be added to this program of range development in the hands of the States. * * *

Practically none of these lands can be commercially afforested, but in any event the forest reserves could be rounded out from them where this is desirable. * * *

It is not proposed to transfer forest, park, Indian, and other existing reservations which have a distinctly national as well as local importance.

The forestry program adopted by the directors of the National Lumber Manufacturers Association in their August 9 session at Longview, Wash., recommends that each timberland owner make an economic study of the forest-growing possibilities of his land, and offers the assistance of the association's forestry and other departments in the making of such studies.

Permits are required for the importation of chestnuts and acorns from any source under an order issued by the Secretary of Agriculture, effective September 1. Heretofore this requirement has applied only to chestnuts and acorns of European origin. The purpose of the order is to prevent the entry of injurious insects.

Newsboys of Helena, Mont., in preparation for their annual week's outing at Camp Miracle this summer voluntarily pledged themselves to refrain from smoking while at camp and on their hikes into the near-by forests.

House Subcommittee Inspects National Forests

The Agricultural Subcommittee of the House Committee on Appropriations made an inspection of national forest work in the West during July and August. The members of this subcommittee are: L. J. Dickinson, Iowa; J. P. Buchanan, Texas; J. N. Sandlin, Louisiana; and J. W. Summers, Washington. Accompanied by the Chief Forester the subcommittee visited the Northern, the North Pacific, the California, the Intermountain, the Lake States, and the Alaska National Forest Districts, several of the forest experiment stations, and the Forest Products Laboratory. The party went into the woods and inspected the work of the Forest Service on the ground. They also held hearings, inviting all who wished to make a statement to the committee on any line of work with which it is concerned to do so. The severe fire season enabled this committee to get a strong impression of the difficulties and problems connected with fire-protection work on the forests.

A study of trends of rail traffic in the United States made recently by M. O. Lorenz, director of statistics of the Interstate Commerce Commission, showed that forest products constituted 11.61 per cent of the aggregate tonnage originated in 1900, 12.53 per cent in 1904, but only 7.52 per cent in 1928. Manufactured articles and miscellaneous articles other than agricultural, livestock, mine, and forest products composed 18.32 per cent of the total tonnage in 1900 and 24.26 per cent in 1928.



Rison, a town of some 685 population in southeastern Arkansas, has a mayor who advocates and practices timber growing. The mayor, Finch Culpepper, owns about 1,200 acres of forest land in the neighborhood of Rison, all of which he protects from fire. Under the direction of H. S. Hinson, county agricultural agent, Mayor Culpepper is conducting a thinning demonstration on an acre of his pine timberland located 3 miles east of Rison on the Randall road.

Foreign Notes

Forests of Venezuela

Forest and grassland occupy in approximately equal measure the area of nearly 400,000 square miles included in the Republic of Venezuela, writes Lewis A. Cummings in *Tropical Woods*. Although Venezuela lies wholly in the Tropics, because of its topography it enjoys a variety of climates. The heart of the country is occupied by the savannahs of the great Orinoco Basin; flanking these are hills and high mountains for the most part covered with forests.

In the lower zones and hot lands where rainfall is scanty and unevenly distributed through the year occur the "dry forests," in which cacti are abundant and lianas are entirely absent. These forests comprise about 15 per cent of the total forested area. One class of dry forest is composed mainly of thorny trees and shrubs; in some places there are nearly pure forests of a giant cactus known as Cardón, which is a source of a yellowish lumber used locally to make chairs and small tables. The second class is chaparral, occurring in certain very dry regions of the interior at altitudes generally less than 3,000 feet.

Transition forests, differing from the dry forests in the abundance of lianas and in the absence of cacti and thorny trees and from the rain forests in the predominance of deciduous species, occupy about 30 per cent of the timbered area and contain from

5,000 to 10,000 board feet of timber to the acre. In some places palms are abundant and very conspicuous. In general these transition forests occur between the dry forests of the low country and the temperate forests of the high regions. They cover a large portion of the drainage around Lake Maracaibo south of the dry forests; the southern slopes of the Cordillera de Merida between elevations of 2,500 and 8,000 feet; the vicinity of Carabobo and Yaracuy; and the immense territory of Guayana in the southern part of Venezuela. The soils are generally deeper and richer than those in the dry forests, the ground cover of weeds, ferns, etc., is not heavy, and the forest floor is very rich in humus, litter, and duff. Extensive areas have been cut over in the Lake Maracaibo region and around Carabobo and Yaracuy. The lands are well suited for agriculture. The transition forests contain trees that produce rubber, balata, and chicle.

In the rain forests of Venezuela, as in those of other tropical countries, some of the trees reach enormous proportions and their crowns, interlaced with lianas and crowded with epiphytic plants, form a canopy over successive stories of smaller trees. Little sunlight reaches the ground. The forest floor is perennially damp and is covered with decaying vegetation. The rain forests occupy regions of heavy precipitation on the lower slopes of the Andes southward of Lake Maracaibo, in the valley of the Tocuyo, in the

Amacuro Delta and the eastern part of the country near the British Guiana border, and in the great southern area that adjoins Brazil and includes the divide between the Orinoco and Amazon drainages. The rain forests comprise nearly half the forested area. Their average stand is estimated at about 10,000 board feet per acre.

In colder regions occur temperate rain forests, which differ noticeably from the tropical rain forests in the absence of lianas. They are found at comparatively low altitudes in the Colonia Tovar and at higher elevations in Sierra de Perija and the Cordillera de Merida. They comprise about 5 per cent of the total forest area. The temperate forests are well developed in the populated districts of the Andes, but their composition is only imperfectly known.

The Orinoco savannahs or llanos cover 123,000,000 acres, an area four times that of the State of Pennsylvania. The lands, especially the central and northern portions, are flat or gently rolling. The forests are scattered and open, and consist of only a few species.

There are between 250 and 300 kinds of timber trees in Venezuela, representing the widest possible range in structure, properties, and utility. Many of them are used locally, but only a few are exported. Among the latter are zapatero (West Indian boxwood), cedro (cedar), caoba (mahogany), vera, guayacán (lignumvitæ), roble colorado, granadillo (partridge wood), and bálsamo. The Venezuelan timber best known on foreign markets is the zapatero, and the most valuable forest product exported is balata gum. The country's timber resources have been little exploited commercially, and most of the lumber consumed in the larger centers of population is imported from the United States.



J. Reynard, writing in Bois et Resineux, attributes the Graf-Zeppelin's failure in its second attempt at a transocean flight to the mistral, and proceeds to discuss the origin of this northerly wind that blows across central France. Says M. Reynard:

The Greek historian Alexander affirms that the mistral was unknown in Provence before the deforestation of the Cevennes. * * * The difference between the climate in the south of France and that in the northwest creates a permanent air current, which traverses the central plateau. So long as this plateau was normally forested the speed and violence of this wind was no more than is usual in cases of such atmospheric displacement. But after the deforestation of the plateau and of the valleys of the tributaries of the Rhone, the air passing through these defiles was compressed forcibly between the denuded mountains and emerged in the valley of the Rhone and in Provence blowing at the rate of 80 kilometers an hour. It was against this wind that the Zeppelin was unable to make headway.

A Control for Phacidium Blight on Conifers

(From report by J. H. FAULL to the Canadian Society of Forest Engineers)

Phacidium blight of conifers can be easily and cheaply controlled in nurseries through late fall spraying with lime sulphur.

In various parts of eastern Canada and of the Northeastern States this blight attacks spruce, pines, firs, arborvitæ, hemlock, and Douglas fir. The firs and various spruces are especially susceptible to it. The disease makes its attack on foliage below the snow cover, and is favored by a cover of snow that persists throughout the winter. It is capable of spreading rapidly and causing great losses. Few fir or spruce trees attacked by it escape destruction unless their leaders are well above the surface of the snow. It is caused by a form or forms very similar to if not identical with *Phacidium infestans*, which is said to cause the "Schneeschlütte" that attacks Scotch pine in Europe.

Foliage affected by *Phacidium* blight assumes a soft and more or less glaucous brown color. In closely planted nursery beds the blight occurs in subcircular patches that may be 2 feet or more in diameter, or, where the plants are in fully separated lines, in strips. On older trees masses of branches on one side, or all those within certain horizontal planes, are browned; and if the trees have suffered from the disease in previous years the newly browned foliage is contiguous to branches that have already been more or less completely defoliated or to branches on which the needles are withered and whitened. Leaves of all ages are equally liable to attack. Diseased needles of white pine drop during the first summer, those of fir and arborvitæ carry through the following winter, and those of spruce commonly adhere throughout the winter unless too much subjected to drought or wind or other disturbing agencies. An additional symptom is the appearance in the fall of subepidermal disk-like apothecia on needles browned the preceding spring. These are exposed by the irregular dehiscence of the overlying epidermis, and spores are discharged from them in mild, damp weather until winter sets in. It has been noted also that black microsclerotia occur almost constantly on the affected needles in the spring. Just as the snow melts away a covering of white mycelia may be observed on the browned foliage.

Observation and experiment have established beyond question that the disease is infectious and contagious and that it is due to a fungus. It seems obvious that primary infection occurs in the fall, by means of discharged ascospores. These germinate readily without a resting period. It is certain that a very important cause of infection is the mycelium

in the browned needles. During the latter part of the winter, for a few weeks before the snow departs, this mycelium grows out under the snow onto adjacent foliage and enters dormant healthy needles.

In experiments in the control of this disease nursery beds have been sprayed with lime sulphur (dormant) of various strengths in the late spring and in the fall. In some cases the diseased plants were removed before the beds were sprayed; but this proved to be of no value. Spraying in the spring was likewise of no effect. On the other hand, spraying with lime sulphur in the late fall gave perfect control. After such spraying not only did the disease cease to spread but some apparently dead plants revived to the extent of unfolding meager new foliage in the following spring.

In order to control the blight on plantations, only positively healthy stocks are used and these are first sprayed or dipped in lime sulphur. In some established plantations the diseased stock was pulled by hand and carried in sacks to canvas-lined wagons, removed, and burned. The full value of this measure can not be fully appraised for another year or two. In the fall of 1927 diseased branches were removed from a number of 6 or 8 year old trees and burned. Some of these trees showed a little browning in the spring of 1928, but several came through clean. An experiment is projected in thorough fall spraying of diseased trees in the plantations.

The cost of fall spraying in the nursery and of removal of diseased plants from the plantation is trifling.

It is a safe conclusion that *Phacidium* blight of conifers is native to America; under such circumstances the sane procedure is not to employ embargo or quarantine except in the case of willfully neglected nurseries, but to be ever on the alert and to adopt control measures wherever the disease shows itself.

Fire Protection Along a Canadian Railway System

The Canadian National Railways, with lines traversing about 9,000 miles of forested land, report that fires originating in their operations destroyed only \$34 worth of merchantable timber in 1927 and only \$54 worth in 1928. In certain parts of this system, notably in British Columbia, where timber values are high and forest growth is extensive, oil burners are used throughout the fire season. On the most hazardous stretches special fire patrolmen are employed; in other parts of the system fire patrol is maintained in connection with track inspection. Twenty-two fire-protection tanks are maintained in the forested territory. Where heavy grades and side-hills exist timber adjacent to the right of way has been removed and firebreaks have been constructed.

Holland's Vocational Forestry School

A system of vocational training in forestry that has been practiced with success in Holland for 25 years is described by J. P. van Lonkhuyzen in a letter to the *Journal of Forestry*. Funds were appropriated by the State in order that a school offering such training might be established by the Dutch Society for the Reclamation of Waste Land (*Nederlandsche Heidemaatschappij*), of which Doctor van Lonkhuyzen is director. Entrance requirements are a common-school education, some agricultural education, and practical experience in agriculture. The minimum age for admission is 18. In each of the two years of the course a 5-month winter term is devoted to theoretical instruction in forestry, silviculture, surveying, levelling, etc.; during each of the two 7-month summer periods the students perform practical forestry work under the direction of officers of the society. This work includes soil cultivation, planting and sowing, thinning, draining, and reclamation.

For several years the society has been giving in different forest centers a short course in forestry designed for forest landowners and woods managers. Ten lessons are given dealing with methods of afforestation, forest management, characteristics and value of the principal forest trees, timber measuring and estimating, and forest enemies. The course concludes with an excursion to some forest estate.

Courses in tropical and European forestry leading to an engineer's certificate are given at the Agricultural University, Wageningen. Most of the graduates accept positions with the State forest service in Holland or in the East Indies, with societies, or with private forest proprietors.

Turkish Forest School

Mashar Bey, a Turkish forester, is authority for the statement that Turkey has had a forest school since 1855. This school was founded by a French forester, and until 1917 its curriculum was based on the programs of studies at the French forest school at Nancy. In 1917 the course was changed from two to three years and the school reorganized on the model of the German forest schools. Its faculty consists of 10 professors, of whom 4 conduct courses in forestry and 2 in engineering. There are about 60 students in the school at the present time.

The school is situated about 15 kilometers from Constantinople, at Bagce Köy. The school building is located at the center of the school forest of about 5,000 hectares. This forest is composed almost entirely of hardwood, the principal species being oak and beech.

Some Regulations for Privately Owned Forests in France

For as long as five months in each year French prefects may forbid landowners to make fires in their forests. With the consent of the Council of State certain forests may be classified by decree as being particularly exposed to fire, and owners of forests so classified may be compelled, if they do not do so voluntarily, to group themselves in fire-protection associations, acquire protection equipment, and organize fire-protection forces. Protection activities under this provision are controlled by the State and receive financial support from the State. The French forest protection law of 1924 further provides that railroad companies may clear a strip 20 meters wide on each side of their rights of way without the consent of the owners of the land.

On forest areas that have been burned over the prefects can ban grazing, even of the owners' stock, for a period of 10 years following the fire. Burned areas sown or planted may be exempted from taxation.

Private owners of forest land in France have the privilege not only of calling upon officers of the forest service for help in their forestry operations, but of entrusting the supervision and management of their forests temporarily to the forest service. Under the latter arrangement the owner decides upon the operation to be carried out and pays the State for the services rendered.

Before clearing forest land the French landowner must notify the prefectural authorities four months in advance. The Minister of Agriculture may interpose an objection to the proposed clearing if, with the advice of the Council of State, he finds it undesirable from the point of view of maintenance of soil on slopes, protection of soil from the action of water, protection of springs and streams, protection of the seacoast from the action of the sea and from drifting sand, national defense, or public health. An owner who clears forest land without giving notice or before the expiration of the required period, or in defiance of Governmental objection, is liable to severe penalties and may also be obliged to reforest the cleared land. Owners are not required to give notice of their intention to clear artificially established stands less than 20 years old, parks or gardens adjoining dwellings, or isolated woods covering less than 10 hectares and situated outside the mountain regions.

The application of this antideforestation law, remarks M. Passebois, principal inspector of waters and forests, permits action to prevent the diminution of

the wooded area, but does not provide a means of preventing impoverishment of stands. So long as the wooded condition is preserved, the law does not enable the Government to prevent abusive cuttings. This defect is partially compensated by provisions of a law of 1922 that gives the Government control of cuttings in certain forests classified as protection forests. This law applies to forests on which the maintenance of the forest in its existing state is considered necessary for the physical and mechanical protection of the soil. In forests which on the advice of the Council of State are classified by decree as of this type the owners may not do any cutting without Government authorization, except cutting of dead and down timber and of as much as 20 cubic meters of living timber a year. Grazing, also, is regulated. The owners of classified forests are entitled to an indemnity corresponding to the reduction in revenue resulting from the classification, and if this reduction amounts to half the normal revenue from the forests they may demand that the land be taken over by the State. In any case the State has the right to expropriate forests classed as protection forests. Considerable resistance on the part of owners has hindered the application of this law, M. Passebois observes, and the law has not been in effect long enough to permit an appraisal of its effectiveness.

Anti-Deforestation Propaganda in France

French journals, notably *L'Illustration* and the *Bulletin de la Société Forestière de Franche-Comté*, have recently been carrying appeals to the people of the nation to interest themselves in checking the deforestation of France. It is stated that at the time of the revolution of 1789 there were, according to good authority, from 15,000,000 to 16,000,000 hectares of forests in France. At the present time only 10,330,805 hectares remains, of which 1,354,220 hectares is in State forests, mostly standards, 2,150,465 hectares in communal or institutional forests, largely coppice under standards, and 6,826,120 hectares in private ownership, of which a very large proportion is in simple coppice or coppice with standards of little value. Since the war clearing and destructive logging have been reducing the area of forests at an alarming rate. A recent investigation by the forest service revealed that in the past 10 years 200,000 hectares had been devastated by destructive logging. It has been estimated that more than 5,000,000 cubic meters of wood is now being removed from the forests yearly by improper methods of cutting. France faces the prospect of an alarming shortage in timber supply and can not

depend on making up the difference from its colonies, for the reason that though there may be from 80,000,000 to 90,000,000 hectares in the colonial French forests most of the timber is too far from the coast or from transportation facilities and not more than about 8,000,000 or 9,000,000 hectares is available.

It is estimated that there are in France about 8,000,000 hectares of idle lands, a great part of which could be put into timber. The present rate of reforestation is about 11,000 hectares a year. In order to bring the gravity of the situation before the people of France a plan is under consideration for special observances on Armistice Day.

Talkies Featured by Canadian Forestry Association

The Canadian Forestry Association had 15 lecturers in the field during the past summer and also presented lectures through the medium of sound films. "Talkie" motion picture effects were provided in the railway lecture car which the association sent on a tree-planting campaign through the Prairie Provinces and British Columbia and in a lecture "caravan" presented to the association with complete equipment by John H. Price, president of Price Bros. and Co., Quebec. The caravan toured Quebec and northern New Brunswick, giving motion-picture programs in daylight as well as in the evening. Through the medium of the "talkies" it presented forest conservation lectures by Premier Taschereau; Hon. Honoré Mercier, minister of lands and mines of Quebec; E. W. Beatty, president of the Canadian Pacific Railway; and Sir Henry Thornton, president of the Canadian National Railways.

At the end of July audiences reached this year by the association's lecturers totaled 179,148 persons.

Forests of Yugoslavia Mostly in Public Ownership

According to L. Markovitch, forest inspector at Belgrade, the forests of Yugoslavia have an area of 7,586,026 hectares, including 546,443 hectares of denuded land. Of the forested area 23 per cent is occupied by beech, 10.2 per cent by oaks, 55.6 per cent by mixed hardwoods, and the remainder by conifers. Among the softwoods are Scotch pine, spruce, fir, black pine, and cypress. Nearly half the wooded area (47.7 per cent) is in public forests, 19 per cent is in communal and institutional forests, and 33.3 per cent is in private ownership. Mr. Markovitch estimates that the production amounts to about 15,000,000 cubic meters a year. Exports of wood compose about 24 per cent of the total exports of the country.

Release Cuttings by Machinery

A woodland owner named Doré at Darmannes, Haute-Marne, France, is using successfully a machine of his own devising for cutting back the sprouts of hardwood in order to release planted spruce and fir and Scotch pine. Before the planting the hardwood is cut clear. The conifers are planted in straight lines spaced 2 meters apart. At the end of three years, during which time the hardwood sprouts have grown rapidly, the machine is drawn between these lines by a horse. The machine cuts off the sprouts at about 25 or 30 centimeters from the ground and clears a space 2 meters in width between the lines of planted conifers. Only a narrow strip of hardwood sprouts is left on the line and in the intervals between the planted conifers, just enough to provide a light shade for the conifers. Two men and a horse are required to operate the machine, which clears at least 3 hectares a day. The expense is estimated at less than 100 francs a hectare for the first cleaning; subsequent cleanings cost less. These costs are about one-fifth as much as the cost of doing the same work by means of hand labor. The machine consists of a frame, mounted on two large wheels, with a small motor mounted at the front, a movable section pivoted from the front and operated by a lever at the back, and in the rear two drums attached to the movable section. The two drums are clamped to a revolving shaft, one on each side of a pulley attached to the center of the shaft. Each drum consists of two wheels with the ends of 3 blades riveted to them, the cutting edge of the blades pointing to the rear. The shaft is attached to the movable frame, so that it can be set at the desired height or can be raised by the lever in order to pass obstacles. The shaft is turned by a belt driven by the small motor, which is of 8 horsepower. A detailed description of the machine with diagram is given in the June, 1929, number of the Bulletin de la Société Forestière de Franche-Comté.

It is reported by Bois et Resineux that Albert Nodon, president of the Astronomical Society of Bordeaux, has shown that the leaves of trees are the seat of radioelectric manifestations. This activity is greater in the flowering season and in sunlight. Because of this radioelectric activity of the leaves, radio waves passing over forests are deflected and radio antennæ in the forest have to be elevated to great heights to escape this influence.

The Tharandt Forstliche Hochschule, Saxony, Germany, has united with the Technische Hochschule, Dresden.

Personals

Fred B. Merrill, formerly assistant State forester of Georgia, has taken office as State forester of Mississippi, succeeding R. L. Hogue. Mr. Merrill, a graduate of Cornell University, was for a time assistant State forester of North Carolina and later State forester of Kentucky. H. C. Mitchell will continue as assistant State forester of Mississippi.

S. H. Marsh has resigned as district inspector for Clarke-McNary work in the Southeastern States, to become vice president and general manager of the Ford Motor Co. at Staunton, Va. Mr. Marsh joined the United States Forest Service in 1911, the year of his graduation from the Yale School of Forestry. He was engaged for some years in the examination of forest lands for acquisition under the Weeks law, and when the Shenandoah National Forest was created became its supervisor. He was appointed Clarke-McNary inspector in 1927.

Charles F. Evans is filling the vacancy left by Mr. Marsh's resignation, by transfer from the post of district inspector for Clarke-McNary work in the Gulf States. Mr. Evans's headquarters will be at Asheville, N. C.

W. R. Hine has resigned as superintendent of forestry of Louisiana to accept the Clarke-McNary inspectorship in the Gulf States. Mr. Hine returns to the Federal service after four years in the State position. He was formerly a member of the staff of the Southern Forest Experiment Station.

Charles A. Gillett has been appointed extension forester of Arkansas, succeeding William K. Williams. Mr. Gillett was extension forester of North Dakota from 1925, the year of his graduation from Cornell with the bachelor's degree in forestry, until 1928, when he returned to Cornell for graduate study that led to the degree of M. F. In connection with his graduate work he served as assistant extension forester of New York.

Lyle F. Watts has returned to the United States Forest Service, from which he resigned in 1928 to take a position on the faculty of the forestry department of the Utah Agricultural College. He has been reinstated as senior silviculturist, Great Basin Experiment Station. Thornton G. Taylor, formerly with the United States Forest Service and until recently associate professor of forestry at the Idaho School of Forestry, succeeds to Mr. Watts's position at the Utah college.

David A. Kribs, a 1929 graduate of the Yale Forest School, has been awarded a National Research Fellowship and will spend a year in study at Bussey Institute, Harvard University.

Paul D. Kelleter has left the position of director of extension, New York State College of Forestry, to accept that of administrative assistant to the Federal Farm Board. Mr. Kelleter was a member of the United States Forest Service from 1904 to 1923. For seven years of that period he was supervisor of the Black Hills National Forest, S. Dak. He resigned from the service as forest inspector, branch of operation, to become director of purchase and sales of the Department of Agriculture.

W. E. White, who received the Ph. D. degree from Yale University this year, is one of the men who have recently joined the faculty of the reorganized Pennsylvania State Forest School. Doctor White received his bachelor's and master's degrees from the University of Vermont, and has served as assistant botanist at the Vermont Agricultural Experiment Station. He will teach botany at the Mont Alto plant of the Pennsylvania college. O. W. Pfeuger, a member of the 1918 class of the Yale School of Forestry, comes to Mont Alto as an instructor in forestry after spending nine and one-half years in the Philippines, where he taught in the forest school and acted as director of forest investigations. C. G. Geltz, who holds the M. F. degree from the University of California, has taught two years at the New York State Ranger School, and has had experience as a ranger on the Ouachita National Forest, will teach forestry at Mont Alto. H. Norton Cope, formerly supervisor of the Alabama National Forest, has resigned from the United States Forest Service, after being connected with it for 13 years, to become instructor in forestry at Mont Alto. H. J. Lutz, who holds the M. F. degree from Yale and has had experience with the United States Forest Service and the Connecticut Agricultural Experiment Station, will serve as assistant professor of forestry at State College. L. V. Kline, who assisted in wood technology at the New York State College of Forestry while earning the M. F. degree, will give instruction in that subject at State College.

C. H. Guise, assistant professor of forest management, Cornell University, has been made assistant director of the forest education inquiry which the Society of American Foresters is conducting under a grant by the Carnegie Corporation and of which Henry S. Graves is director. During the coming school year Professor Guise's work at Cornell will be handled by Francis R. Righter, junior forester at the Southern Forest Experiment Station.

W. H. Horning, formerly a member of the staff of the Pennsylvania State Forest School, has been appointed assistant professor of forestry at the Iowa State College, succeeding Perkins Coville.

Clark C. Heritage, who for nearly two years has had charge of the pulp and paper section of the Forest Products Laboratory, has resigned to assume the directorship of a newly-organized development department for the Oxford Paper Co., Rumford, Me. He will continue work on certain problems of the laboratory in a consulting capacity.

Franklin W. Reed, who has been working under the trade extension committee of the National Lumber Manufacturers' Association as industrial forester, has been made forester of the association. E. T. Allen, of Portland, Oreg., who formerly held this title, has been given the title of forestry consultant.

E. A. Ziegler, formerly director of the Pennsylvania State Forest School, has joined the United States Forest Service and has been placed in charge of a study of the financial aspects of private forestry practice. This study is being begun in the South, with Doctor Ziegler assigned to the staff of the Southern Forest Experiment Station.

F. P. Keen, of the Palo Alto, Calif., forest insect laboratory of the Bureau of Entomology, is being placed in charge of a new laboratory established by the bureau at Portland, Oreg. J. A. Beal, entomologist at the Appalachian Forest Experiment Station, is being transferred to the new laboratory.

John C. Beebe has been appointed associated hydro-electric engineer in the California National Forest District, succeeding E. W. Kramer, now district engineer. Mr. Beebe has had long experience in irrigation and power development and operation in the Northwest. Recently he has been employed in California by the Pacific Gas & Electric Co.

Charles M. Genaux, formerly assistant in forestry at the State College of Washington, has been appointed assistant professor of forestry at the Utah State Agricultural College and extension forester for Utah. Mr. Genaux is a graduate of the Pennsylvania State Forest School, and has received the master's degree in forestry from the University of Idaho.

J. E. Davis, who for some time has been engaged in forestry development in Chautauqua County, N. Y., as assistant county agent, is now assistant extension forester of New York in charge of junior forestry activities.

George A. Walker, a 1929 graduate of the Colorado Agricultural College, has accepted the research fellowship in the Iowa State College for the year 1929-30.

C. J. Telford has been appointed to the staff of the Forest Products Laboratory, Madison, Wis., and will take charge of the laboratory's small-sawmill study. Mr. Telford leaves the position of extension forester of Illinois. Previously he served for several years with the Natural History Survey of Illinois.

J. A. Newlin, who has charge of the timber mechanics section of the Forest Products Laboratory, has been appointed to membership on a newly organized committee on timber in the structural division of the American Society of Civil Engineers.

Officers elected this year by the Yale Forest School Alumni Association are Paul D. Kelleter, president; Marinus Westveld, vice president; and C. Edward Behre, secretary-treasurer. Members appointed to the executive council are C. Edward Behre, Joseph C. Kircher, and Allen M. Tucker.

Bibliography

What About the Year 2000?

By W. N. SPARHAWK, United States Forest Service

In publishing the volume entitled "What About the Year 2000?"¹ the joint committee on bases of sound land policy, organized under the auspices of the Federated Societies on Planning and Parks, does not pretend to be presenting the results of original research. This book, which was prepared under the committee's direction by George M. Peterson, is intended as a preliminary analysis, from a national point of view, of available data on land uses, and an attempt to forecast in a general way the principal surface uses of land in the United States by the year 2000. It discusses the extent and characteristics of our land resources; trends in population; requirements for urban, recreational, forest, and agricultural land; and the progress of planning in the field of land use. The

conclusion is reached that with properly coordinated, systematic planning the United States need not worry over the doctrines of Malthus; in the year 2000 not only will there be abundant food for the expected population of nearly 200,000,000 but there will be plenty of land for cities, for recreation, and for forests.

In discussing forestry uses of land the author advances the view that "it is quite conceivable that forestry could be overexpanded just as agriculture has been," and raises the question "may it not be wise to keep some idle agricultural land in reserve?" Comparing the per capita consumption of wood in this country with the much lower consumption in Europe, he states that the latter "represents to some extent the amount of timber that will be consumed when trees are grown as a crop." This statement, of course, is based on an entirely erroneous conception of the reasons for low wood consumption in those portions of Europe that are responsible for the low average.

¹ Mt. Pleasant Press, Harrisburg, Pa.

The book brings out very clearly the desirability of more exhaustive research and of much wider activity in the promotion of coordinated local, regional, and national plans for land use. Without such planning, it is doubtful that our increasing population will be able to maintain such high cultural standards and such high standards of living as we now enjoy.

A Comprehensive Text on Plant Ecology

By DORIS W. HAYES, United States Forest Service

Plant Ecology,¹ by John E. Weaver and Frederic E. Clements, is a comprehensive textbook of botanical ecology that should prove equally interesting and useful to the teacher, the student, and the practical field worker. It is the outgrowth of many years of research and teaching by both authors, and comprehends the general course in ecology given by Doctor Weaver in the University of Nebraska. Repeated use by classes has proved the ready comprehensibility of the text and the workability of the experiments. The style of presentation is interesting and unpedantic. The volume contains in its 18 chapters 477 pages of discussion and 262 illustrations, and is completed by a bibliography of more than 600 entries, a table of contents, and an index.

The inclusion of Doctor Clements's system of classifying vegetational units, climax formations, and plant succession will prove of value to many who do not have access to his Plant Succession, now out of print.

The origin, development, and structure of vegetation and the methods of studying it are discussed and well illustrated. Ample consideration is given to the various factors of the habitat, such as soil, light, water, and wind, to the response of plants to each of these factors, and to the instruments for measuring them.

Chapters on plants and plant communities as indicators, competition and invasion, and relations between plants and animals contain much practical information of considerable economic value.

An especially valuable addition to the literature of ecology is the chapter Relation of Underground Plant Parts to Environment, which fills a long-felt need for accurate information concerning root habits and activities.



A booklet telling how to identify the white pine blister rust and prevent its spread was published this season by the New York Conservation Department and provided on request to Boy Scout, Girl Scout, and other summer camps in the State. The booklet was prepared by Henry L. McIntyre, State supervisor of forest pest control.

¹ McGraw-Hill Book Co. (Inc.), New York.

Measuring Costs and Results in Extension Work

By C. E. RANDALL, United States Forest Service

In such varied and roundabout ways does our educational work take effect that it is difficult to trace its progress. When we fire a broadside of educational effort at some objective it would often be helpful to know which particular shot hit the bull's-eye; but often the distinction is impossible.

Some light has been thrown on the relative effectiveness of various educational methods by means of a study recently completed by H. J. Baker, director of extension, New Jersey, and M. C. Wilson, in charge of extension studies, Office of Cooperative Extension Work, United States Department of Agriculture. In this study an effort was made to determine what influences had led to the adoption of 30,183 improved farm and home practices on 9,872 farms in 14 States.

The adoption of 44 per cent of the total number of improved practices was credited to publicity methods, including news stories, bulletins, circular letters, posters, exhibits, general meetings, and radio talks. The printed or written word proved strikingly effective. News stories, bulletins, and circular letters were credited with the adoption of the improved practice in 23.8 per cent of all the cases covered by the study, the news story alone being credited with 12.8 per cent. The proportions of the 30,183 changes in practice found to be attributable to individual methods were as follows:

	Per cent
Method demonstrations and leader training	20.49
Result demonstrations	8.06
Farm or home visits	15.45
General meetings	18.07
Bulletins	8.65
Office calls	8.36
News service	12.82
Exhibits	.77
Correspondence	1.56
Extension schools	.97
Circular letters	2.33
Telephone calls	.49
Study courses	.19
Radio	1.75

On the basis of data furnished by 17 States, Messrs. Baker and Wilson present figures on the division of these States' extension funds among the various methods employed in extension teaching. The costliness of several of the methods was found to be in striking contrast with their effectiveness. Method demonstrations and leader training ranked about equally in the two respects, since they consumed 19.65 per cent of annual extension expenditures and caused 20.49 per cent of the changes to improved practices. But result demonstrations, which consumed 17.22 per cent of the outlay, accounted for only 8.06 per cent of the results, and exhibits, on which 4.2 per cent of the extension budget was expended, were credited with only 0.77 per cent of the results; while news service, which repre-

sented only 4.6 per cent of the expenditures, accounted for 12.82 per cent of the changes in practice. When the percentage of annual expense represented by each of the extension methods was divided into the percentage of the changes in practice which that method brought about, the following ratios were arrived at:

News service.....	2.79
Circular letters.....	1.83
General meetings.....	1.72
Office calls.....	1.56
Bulletins.....	1.40
Farm or home visits.....	1.13
Leader training and method demonstrations.....	1.04
Result demonstrations.....	.47
Correspondence.....	.45
Telephone calls.....	.44
Extension schools.....	.34
Exhibits.....	.18

Although the study indicates that the printed word gives much larger returns per unit of cost than any other extension method, the authors do not recommend abandonment of any available method. It is by firing a broadside that we are most apt to score a hit. The authors point out that for different tasks different methods are the most effective, and also that even the least effective method will enlarge the total of extension accomplishment if it occupies time not otherwise profitably employed. It would seem wise, however, to place as much emphasis as circumstances permit on those methods that, in general, yield the largest returns upon money and time invested.

Trees for the Roadside

A timely book, much needed, entitled "Roadside Development," has just come from the pen of J. M. Bennett, superintendent of parks and forestry, board of county road commissioners, Wayne County, Mich. The author, who is a forester, devotes a large proportion of the book to the use of trees. He has had experience in surveying, designing, and building roads, however, and has evidently become well acquainted on the ground with the other aspects of road development.

The material in the volume on the use of trees in roadside development is comprehensive and practical. It includes information on the species to plant, the methods of obtaining and handling the stock, and the care of the trees after planting. The question of where and how to use trees in the design of a highway is gone into in detail, with attention to all such considerations as the relation of the trees to pole lines that must parallel the highway, drainage, gas and water mains, smoke, insects and diseases, roadway widths, and the soil and topography of the country through which the highway passes. A résumé of what has been done and is now being planned in various States in the way of roadside development is given, and appendices contain the New York parkway law

and laws of New Jersey and Maryland regarding roadside trees.

The most impressive thing about the book is the practical and usable character of the information it contains. It is full of the right kind of ammunition for the man who has a roadside development problem to attack and wants to begin at once.

New Handbook on Wood Construction Principles

A handbook on the properties of wood and its use for construction purposes has recently been published by the National Committee on Wood Utilization, United States Department of Commerce, under the title "Wood Construction." The author is Dudley F. Holtman, the committee's construction engineer. The committee's announcement states that the preparation of the volume was made possible through the cooperation of many leading authorities in the architectural, engineering, contracting, and building fields and in the lumber industry, in furnishing information concerning wood-construction practices and methods. Information was contributed also by the United States Forest Service and the National Lumber Manufacturers Association.

Early chapters of this volume discuss factors affecting the use of wood in construction, lumber grading, working stresses, and the properties, availability, and major uses of the principal woods employed in building and construction. A chapter on the identification of common woods includes keys. Other subjects discussed are the use of paints and stains, methods of protecting wood from fire, decay, and insect damage, and principles governing the different methods of framing wood, from light building construction to heavy industrial building and bridge construction. An appendix gives weights of various softwoods grown in the United States, grades of yard-lumber products cut from various species of softwoods, and the range of grades of softwood lumber used for specific purposes.

The book has 689 pages of text and many illustrations. Copies can be obtained through the National Committee on Wood Utilization, Department of Commerce, Washington, D. C.

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The proceedings of the Eleventh Southern Forestry Congress, which was held at New Orleans, La., April 4 and 5, 1929, and a report of which was published in the Forest Worker of July, 1929, have been printed as a paper-bound volume of 183 pages. Copies may be obtained from the State foresters of the Southern States or from W. R. Hine, secretary of the congress. Mr. Hine may be addressed at the Stern Building, Baronne Street, New Orleans.

Strength of North American Woods

Handy reference tables showing the strength of the important commercial woods of the United States have just been published by the United States Forest Service. For 129 different species of woods the tables give an index of strength in bending, strength in compression parallel to grain and perpendicular to grain, stiffness, hardness, shock-resisting ability, and shearing strength parallel to grain. The weight per cubic foot, specific gravity (oven dry), and shrinkage from green to oven-dry condition also are given.

These tables were compiled by H. S. Betts, senior engineer, on the basis of approximately 130,000 tests made at the Forest Products Laboratory over a period of 15 years. They have been used by the Forest Service for some years. They are useful in comparing the properties of the different woods, in selecting woods for particular uses, and in establishing approximate working stresses.

Copies of the tables, which are published as Miscellaneous Publication 46-M, *The Strength of North American Woods*, can be procured free while the supply lasts from the Office of Information, United States Department of Agriculture, Washington, D. C.

Recent Books and Pamphlets

- Ashe, W. W.: Profit or loss in cutting shortleaf and loblolly pines in Alabama. 64 pp. (Alabama State Commission of Forestry bulletin no. 2.) Montgomery, 1928.
- Canadian Bureau of Statistics: Forestry in Canada. 30 pp. (Reprinted from the Canada Year Book, 1929.) Ottawa, 1929.
- Craib, I. J.: Some aspects of soil moisture in the forest. 62 pp. illus. (Yale Forest School bulletin no. 25.) New Haven, 1929.
- Georgia State Board of Forestry: Second biennial report, 1927-28. 39 pp. illus. Atlanta, 1929.
- Holtman, D. F.: Wood construction—principles, practice, details: A project of the National Committee on Wood Utilization. 711 pp. illus. McGraw-Hill Book Co., Inc., New York, 1929.
- Kittredge, J., and Chittenden, A. K.: Oak forests of northern Michigan. 47 pp. illus., map. (Michigan Agricultural Experiment Station special bulletin no. 190.) East Lansing, 1929.
- McIntyre, A. G.: Black locust in Pennsylvania. 20 pp. illus. (Pennsylvania Agricultural Experiment Station bulletin 236.) State College, 1929.
- Miller, R. B., and Tehon, L. R.: The native and naturalized trees of Illinois. 339 pp. illus., maps. (Illinois Department of Registration and Education, Division of the Natural History Survey bulletin, vol. 18, art. 1.) Urbana, 1929.
- North Carolina Department of Conservation and Development: Second biennial report for the biennium ending June 30, 1928. 105 pp. Raleigh, 1928.

- Richardson, A. H.: Forest tree planting, rev. ed. 64 pp. illus., map. (Ontario Department of Lands and Forests bulletin no. 1.) Toronto, 1928.
- St. George, R. A., and Beal, J. A.: The southern pine beetle: A serious enemy of pines in the South. 18 pp. illus. (U. S. Department of Agriculture farmers' bulletin 1586.) Washington, 1929.
- Society of American Foresters: The forest education inquiry: A preliminary statement of the objectives and plan of procedure. 15 pp. New Haven, 1929.
- Southern Forestry Congress: Proceedings of the Eleventh Southern Forestry Congress. 183 pp. illus. New Orleans, 1929.
- Spaulding, P.: Decay of slash of northern white pine in southern New England. 20 pp. illus. (U. S. Department of Agriculture technical bulletin no. 132.) Washington, 1929.
- Wackerman, A. E., and others: Yield of jack pine in the Lake States. 23 pp. illus., map. (Wisconsin Agricultural Experiment Station research bulletin 90.) Madison, 1929.
- Zon, R., and Averell, J. L.: Drainage of swamps and forest growth. 22 pp. illus., maps. (Wisconsin Agricultural Experiment Station research bulletin 89.) Madison, 1929.

Articles in Periodicals

- Cross Tie Bulletin, July, 1929.—Cross tie requirements of electric railways, by H. H. George, pp. 1-12.
- Forstwissenschaftliches Centralblatt, July 15, 1929.—Die entwicklung holzverkohrender betriebe, by H. O. von Bonin, pp. 509-521.
- Journal of Forestry, April, 1929.—Forest management incentive to private operators, by E. T. F. Wohlenberg, pp. 333-346; Forest conservation in Ontario, by R. S. Kellogg, pp. 429-431.
- Journal of the American Society of Agronomy, June, 1929.—Range research of the United States Forest Service, by W. R. Chapline, pp. 644-649.
- Paper Trade Journal, May 23, 1929.—Review of cellulose chemistry developments, by J. L. Parsons, pp. 73-74; Survey of chemistry of lignin, by E. Heuser, pp. 75-78.
- Quarterly Journal of Forestry, July, 1929.—The heart rot of timber in relation to forest management, by W. R. Day, pp. 242-251.
- Schweizerische Zeitschrift für Forstwesen, June, 1929.—Einfluss des waldes auf den wasserabfluss bei landregen, by H. Burger, pp. 196-199.
- Southern Lumberman, July 15, 1929.—Determining the timber-yielding capacity of southern pine soils, by E. L. Demmon, pp. 53-54.
- Timberman, July, 1929.—Factors affecting cost of tractor logging in California pine, by M. E. Krueger, pp. 65-67, 70, 74.

Recent Publications of the Forest Service

- Department Bulletins: 1497, Forest Planting in the Lake States; 1499, Timber Growing and Cutting Practice in the Lodgepole Pine Region; 1500, The Gluing of Wood.
- National Forest Map Folders: Gila, Coconino.
- National Forest Administrative Maps: 1/4-inch, Humboldt; 1-inch (3-color, contour), Shasta.
- National Forest Proclamation Diagrams (changing interforest boundaries): Uinta, Medicine Bow.